

THE DOCK & HARBOUR AUTHORITY

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Editorial Comments.

ANNUAL REPORT OF THE NEW ORLEANS DOCK BOARD.

The thirty-second annual report of the Board of Commissioners of the Port of New Orleans shows an exceedingly satisfactory condition at the close of the fiscal year ended August 31st, 1928. Total assets as shown in the general consolidated balance sheet are \$55,040,586.74, liabilities \$48,824,104.52, with a surplus of \$6,216,482.22, in addition to reserves of \$4,882,175.69, which are \$10,870 for Workmen's Compensation, \$2,983,829.34 for depreciation, and \$1,887,476 for contingencies.

During the fiscal year under review, 4,983,770 tons of merchandise were handled over the public facilities administered by the Board, of which 447,421 were grain, 342,484 aluminium ore and other bulk commodities, and 4,193,865 general merchandise. The importation of 22,993,353 stems of bananas and plantains exceeded any previous record by more than 1,300,000 stems.

Shipping entering the port amounted to 2,946 deep-sea vessels of 10,983,338 gross tons, of which 83 per cent. used the Board's wharves.

Construction executed under the Engineering Department during the year amounted to \$490,568.73. The estimated cost of incomplete construction authorised and under way was \$3,767.50, of which the cost to date has been \$2,402,889.36, leaving a balance of construction to be completed estimated at \$1,364,610.64. (A great part of this has been executed since the close of the report, including the modern green coffee terminal at Poydras Street, the Girod Street Wharf, the river-gate Wharf of Canal Street and the Departmental Office Building facing the Canal Street Plaza).

CALCUTTA'S NEW DOCK.

Calcutta's new dock, the construction of which cost the Government of Bengal Rs. 10 crores, was formally opened by His Excellency the Viceroy on the 29th December. King George's Dock, to give it its proper name, is one of the largest and most important dock engineering undertakings in the world. Calcutta has long since made its place among the great ports of the world, and this new dock will yet further add to its usefulness and dignity.

This scheme, which cost Rs. 10 crores, and which covers a total area of four square miles of land, was started in March, 1920. It provides for a new and independent dock system in Garden Reach, running north and south, and consisting of a basin at the riverside end and two long arms, each about 1,500-ft. long.

The water area of the dock is about 190 acres and the length of the quay wall is about 25,000-ft., and the number of berths is 35. The basin into which the lock and the dry docks enter is 1,200-ft. square, and the two arms are 4,500-ft. long by 650-ft. in width. The entrance lock is 700-ft. in length by 90-ft. in width, with a depth of water on the sill of 22-ft. at the lowest low water and 56-ft. at the highest water, while two dry docks measure in all 1,190-ft. in length by 80-ft. in width.

Of the 35 berths which it is proposed, ultimately to provide, 33 will be equipped as either import or export berths and of the other two, one will be for steamers waiting and the other for heavy lifts. At the import berths three-storied sheds, able to accommodate 9,400 tons of cargo will be provided.

It is estimated that each year of construction about 64,000,000 bricks, 1,600 tons of cement, 5,000 tons of lime, 4,000 tons of steel and 900,000 cubic feet of stone were used, and that 13,250,000 cubic feet of excavation have been done. Nearly 10,000 labourers have been constantly employed.

THE PORT OF CIVITAVECCHIA.

The Port of Civitavecchia, which is situated on the west coast of Italy, is known as "The Port of Rome," its situation being ideal and only about 40 miles distant from the Italian capital, and forms the subject of this month's Supplement.

From the historic point of view this port is most interesting, dating back, as it does, to the year 102 A.D., when construction was first commenced, the port then being known as Centumcellae.

For the purposes of discharging the port is equipped with ten cranes in all, which are distributed about the docks. There is also a grain warehouse, built of ferro concrete, with a total capacity of 12,000 tons, a general warehouse and cold store and salt silos.

The fishing industry has lately increased to such an extent that it has proved a great asset to the port. Vast improvements are contemplated and some are at present being carried out, and when these are completed Civitavecchia will be a port worthy of its title, "The Port of Rome."

An illustrated article giving full details of these contemplated improvements and of the trade at the port is given in detail on another page.

DOCK FACILITIES AT BRISTOL CHANNEL PORTS.

The Baltic and International Maritime Conference state with reference to the article in their November circular, dealing with the Coal Trade of Europe, in which, inter alia, they mentioned the closing down, for the sake of economy, of six coal hoists, they have received further information to the effect that, owing to improvement in the trade from the Bristol Channel, it has been decided to suspend the temporary withdrawal of the three loading tips at East Dock, Cardiff, and three at Barry Dock, and that these appliances have again been brought into commission so that all facilities are available for loading and discharging.

It is further reported that the docks are quite full at the present time and in a few cases ships have to wait a little time for berths. However, in view of the large amount of chartering, and the consequent heavy arrivals of tonnage, despatch under the circumstances can be considered fairly good.

MONTREAL'S RECORD NAVIGATION SEASON.

During 1928 navigation season the Port of Montreal scored a new high record in the amount of grain handled. Of this huge amount 215,309,536 bushels were received at the elevators and 210,623,547 bushels were delivered. During the season 1,607 ocean-going ships docked in Montreal Harbour with a net registered tonnage of 5,492,972 tons, compared with 1,231 ships in 1927 of 4,252,000 registered tons.

The value of the grain shipped from the port in 1928 is estimated at over \$250,000,000, while the total value of all commerce that passed through the Port of Montreal, the largest inland port in the world, had a value of about \$1,000,000,000.

Sixty years ago the total tonnage of ships that docked in the Harbour of Montreal was less than 200,000 tons. It is now the principal port in Canada and one of the largest in the world. It has 16 miles of water frontage on either shore of the River St. Lawrence, owned by the public and administered by a Harbour Commission appointed by the Dominion Government. There is ample wharfage for 100 ocean-going vessels. There are 69 miles of electric railway as part of the harbour equipment and the most up-to-date grain and general commerce handling equipment.

Development of Icelandic Lighthouses during Fifty Years.

THE REYKJANES LIGHTHOUSE.

On December 1st, 1928, 50 years had passed since the establishment of the first lighthouse in Iceland. For more than a thousand years the communication had been carried out between Iceland and the Continent, without any light being issued from the coast to guide the sailors.

Centuries ago, the traffic was carried out by small sailing vessels, which never ventured to cross the Atlantic in winter, when it was dark and stormy, but in summer it is never dark in the North, so there was no urgent necessity for lighthouses.

About the middle of the 19th century, a change began to take place. The old sailing vessels were gradually replaced by steamships, which opened possibilities of a continuous communication by sea all the year round. At the same time the small fishing boats were replaced by bigger vessels, and people began to search the fish farther away from the coast, where they had richer possibilities. Besides the commerce developed rapidly during the later half of the century, so that the absence of lighthouses was felt as an obstacle that ought to be overcome.

The necessity was felt, but there were many difficulties to conquer, before a lighthouse could be erected. The impulse must come from Iceland, as the Government, which then resided in Copenhagen, and knew little about Icelandic conditions, could not be expected to take an interest in such things. The Members for Reykjavik and Akureyri laid the matter before the Parliament, 1875, the first Parliament held after the power of the purse had changed its residence from Copenhagen to Reykjavik. Strange to say, the first thing done about the lighthouse question was the introduction of a Bill of Light Dues. It was proposed that every vessel coming to Iceland between Reykjanes and Cape Horn, should pay 0.50 kr. for each ton, but then it was supposed that the lighthouse should be erected in Faxaflói as soon as possible. Parliament refused to take a decision, as the matter had not been sufficiently prepared. There was some doubt as to who should be considered responsible. Some Members said that lighthouses were a common affair between Denmark and Iceland, and the constitution said that Iceland was not expected to contribute to common requirements of the Kingdom. The expenses of lighthouses, therefore, should be defrayed by the Exchequer, also because the Danish lighthouses belonged to the Ministry of Naval Affairs, and all naval affairs were common.

The Bill of Light Dues was carried in the Lower House, together with a request to the Government to enter into negotiations with the French and British Governments, about the light dues to be paid by their fishing boats, whereas the Upper House did not consider it opportune to pass a Bill of Light Dues till a lighthouse had been erected or at any rate decisions of its construction had been made. This could not be done till the autumn of 1877, so there was plenty of time to reconsider the Bill of Light Dues during the Session of 1877. The request of the Government also contained several reasons for the necessity of a lighthouse at Reykjanes, and an application to the King to have the lighthouse constructed as soon as possible by an expert engineer.

The Icelandic Minister in Copenhagen had a different opinion of the matter. He did not consider lighthouses as a common affair; but he sent the application to the Minister of Naval Affairs for advice, and received the answer that only lighthouses of importance for navigation in general could be considered as belonging to the Ministry of Naval Affairs. They thought a lighthouse at Reykjanes of very small importance, the nights being light from March 15th to September 1st., and stated that about 70 vessels at most were likely to pass during winter.—Soon after the construction of the lighthouse, the number of ships passing from August 1st to May 15th proved to be 813; during the same period 1911, there were 1,517, and in later years the trawlers and other vessels have become so numerous that it has proved impossible to keep count of them.

In the end the Ministry consented to construct the lighthouse, on condition that it should be run and maintained by the Icelandic Treasury, which should also contribute 16,000 kr. towards the construction, the total cost of which was calculated about 26,000 kr.

By these agreements it was decided that lighthouses were a special affair of Iceland, and so they have been ever since.

In May, 1878, a Danish engineer was sent to Reykjavik to prepare the construction of the lighthouse. There were many kinds of difficulties to overcome. In the first place no water was available in the locality, so he lost considerable time in sinking three tolerable wells in the ground, consisting of lava, which is very hard and difficult to deal with. The lava affords no satisfactory material for house building, so a different kind of stone had to be brought from far away. Besides, the weather was unfavourable, and whenever there was a fine day, the workmen, mostly farmers or fishermen, had to leave the work and mind their own business.

The work progressed in spite of all these difficulties, and in the end of November the lighthouse was finished and it was lit on December 1st, 1878. This lighthouse was, for the first 20 years of its existence, practically the only one. The building was octagonal, 6.17 m. high. The lantern was of steel and with flat panes and had 15 parabolic mirrors of brass, each with a 14-in. oil lamp.

A man was sent to Denmark to study lighthouses, and on his return he was engaged as a lighthouse keeper, with a salary of 1,200 kr. a year, and a small house was built for himself and his family, where he could keep a cow and a few sheep, and besides there was plenty of fish in the sea all around.

Reykjanes suffers considerably from earthquakes, which have frequently damaged the lighthouse, and gradually sailors began to complain that the light was not powerful enough, which was quite natural, after the apparatus had fallen on the floor several times.

In 1896 a Danish lighthouse expert was sent to Iceland to consider the sites and constructions of two new lighthouses, at Garðskagi and Grótta, and at the same time he was asked to consider what could be done about the Reykjanes lighthouse. He came to the conclusion that the light apparatus was worn and old fashioned and used too much oil, and suggested that another one of a later and much improved construction should be ordered from Paris. If this was done, the three lighthouses could be run at the same annual cost as was spent on Reykjanes alone till then.

The change was brought about on August 1st, 1897, and proved satisfactory.

The lighthouse was built on a steep promontory which the sea had gradually scooped out, and, the cliff consisting of a very loose material, large blocks were constantly falling into the sea, as a result of earthquakes and surf in heavy storms. The sea was approaching the site of the lighthouse, which was now in obvious danger of being swept into the sea. It was, therefore, decided to have it moved to another hill near by, where it was not endangered by the sea, and the change was brought about in 1903. The new lighthouse was cylindrical inside and pyramidal outside, the walls measuring 3.25m. at the bottom and 1.25m. at the top. The height was 22m. The work was done as solidly as possible, with iron-bound concrete, and it was supposed to be able to resist the earthquakes, which has, however, not quite proved to be the case. On three occasions the wall has burst all round, about 9m. above the base. The light apparatus, a 3-wick oil burner with a lens of 4th order, is floating on mercury. It has been damaged several times, when earthquakes have caused the mercury to flow out of the basin, and even the lamp has been thrown on the floor.

The new lighthouse was a great improvement on the old one, but it had the disadvantage that the light was raised 73m. above the sea level and could, therefore, be hidden by clouds even if it was perfectly clear below. Another small lighthouse was, therefore, erected close to the sea in 1909, which had the first light with dissolved acetylene in Iceland.

OTHER LIGHTHOUSES.

For a long time the Reykjanes lighthouse was the only one in Iceland. More lighthouses were wanted, but no experts were there to give advice. In the early eighties several small grants were made, but not sufficient to build a really serviceable lighthouse. For several years a lantern had been lighted on a small island outside Reykjavik, every time a mail boat was expected, and the same thing was done in a few other places. It was not till 1897 that the next two lighthouses were built, one at Garðskagi and the other one at Grótta, both on the west coast, between Reykjanes and Reykjavik. This was done at the expense of the Icelandic Government and the Danish Ministry of Naval Affairs jointly, by the contribution of 11,000 kr. each. At the same time the harbour authority of Reykjavik had asked the Danish Lighthouse Director to procure the apparatus for a leading light for Reykjavik harbour, which was done the same summer.

The lighthouse at Garðskagi, which is fitted with a revolving apparatus, a 5th order lens, and a 2-wick oil burner, is supposed to be among the best in the country, on account of its low position, just above the sea level, so that it is always visible, and not affected by the fog that often covers the hills.

No new grants were made by the two following Sessions of Parliament, but the sailors were beginning to realise the importance of lighthouses to navigation, and a petition for 13 new lighthouses was laid before Parliament in 1900; two of these were granted. These were Elliðaey and Arnarnes, both on the west coast. They were constructed in 1902, and both of them fitted with oil burners. The fixed light at Arnarnes did not prove satisfactory, so it was later made an occulting light, but in the long run this was not satisfactory either, so the lighthouse was rebuilt in 1921 and exchanged for an incandescent gas burner with flashing light and green and red angles showing the dangerous parts. Various troubles occurred at the Elliðaey lighthouse, partly because the room was too small after another light apparatus had been added to the original one, so the light went out or smoked alternately. The fixed white light was not found serviceable, so it was exchanged in 1921 in the same way as the Arnarnes lighthouse.

By this time the necessity for buoys and day-marks was beginning to be realised. Several captains handed in a petition for 18 buoys, etc., in various dangerous places off the coast, one of which was granted, but no inspecting-ship being available, it drifted ashore and the effort was not renewed.

The question of lighthouses was revived in 1905 and a Commission of Danish Naval Officers was appointed. They gave their opinion the same year, suggesting the construction of seven lighthouses at the total cost of about 345,000 kr., exclusive of transport expenses in Iceland. The working expenses were estimated about 21,600 kr. per annum.

The Parliament 1905 granted 15,000 kr. to the construction of a lighthouse in the Vestmanna Islands (a group of rocky islands off the south coast), which was constructed the following year by an engineer of the Danish Lighthouse Department. By and by complaints were made that the light was not sufficiently powerful, but as there was no inspector, and the lighthouse keeper was totally ignorant of the question, nothing was done about it till 1910, when an inspector of all lighthouses was appointed. When he came to the Vestmanna Islands the light was practically invisible, the panes being all scratched by sand. The lighthouse is built on a very exposed place, so the panes have to be renewed every two years. It was struck by lightning in 1921. A fire broke out as a result, and the lighthouse keeper had a narrow escape. This is the only accident of its kind in Icelandic lighthouses, thunderstorms occurring extremely rarely.

The first lighthouse worth speaking of on the east coast was constructed at Dalatangi in 1908. The light apparatus is of the same make as that of Garðskagi, and it has been unchanged up to this day, with the addition of a fog siren in 1918, the first and only one in Iceland, fogs being more frequent on the east coast than in any other part of the country. The siren has functioned about 1,425 hours a year as an average.

The same summer, 1908, a lighthouse was built at Siglunes on the north coast, and equipped with the second light apparatus from Reykjanes, as the granted money was not sufficient to procure a new one. The apparatus was rather out of date and complicated, and grew less and less reliable, so it had to be replaced by an incandescent burner for dissolved acetylene (system Dalen), in 1926.

Up to 1908, light dues had been imposed on ships which arrived between Reykjanes and Cape Horn (west coast) only but three lighthouses having been erected on the north, east, and south coast, a Bill of general light dues for all parts of the coast was carried in Parliament, in 1907.

By this time, dissolved acetylene gas lights were coming in and they proved satisfactory in Denmark, Sweden and other countries, being easier to handle, more reliable and less expensive than the old-fashioned open oil burners, and their introduction in Iceland marked a great step onwards in the development of the lighthouse system. Various improved forms of them have been used ever since in most of the later lighthouses.

The first important lighthouse of this kind was constructed at Dyrhólaey (Portland), on the south coast, in 1910. The lantern was raised on a 7m. high iron frame on a very steep promontory. It was fitted with a dissolved acetylene flasher (system gas accumulator) with an open burner and 3rd order lens drum, and had an optical range of 16 miles. The light was magnified in 1921, and in 1927 the lighthouse was replaced by a concrete tower with revolving 3rd order lens and incandescent burner (system Dalen). The optical range is 35 miles (geographical 27). In connection with this, the first radio-beacon in Iceland was installed in the summer of 1928, by Telefunken, Ltd. This lighthouse, like the one in the Vestmanna Islands, is exposed to damage by sand and pebbles. Once, for instance, eight window panes in the first lantern were smashed simultaneously, in a sand storm, and consequently the light went out and could not be relit for two days.

One or two lighthouses were erected every year during the following period, some of them being constructed of concrete, others of iron, according to the particular conditions at each place.

During the first half of the war all went on as usual, and, the economic state of the country in general being favourable, Parliament began to take a greater interest in the development of a complete lighthouse system. Another reason for this augmented interest was the rapid and successful development of Icelandic trawler fishery and the foundation of the Icelandic Steamship Company. The Director of the Lighthouse Department was therefore charged with the composition of a Bill including the complete number of lighthouses, that he judged necessary, and it was understood that they should be erected gradually during the following decades. The Bill was composed, and after various amendments it was carried several times in Parliament, till it included 63 new lighthouses and fog sirens, but finally it was rejected. In spite of this, later constructions have been carried out in accordance with the plan suggested in the Bill. During the last 10 years the system has developed more rapidly by four to eight new lighthouses a year. The present year has marked a turning point in the history of the Icelandic lighthouses: The first light buoy, with

a whistle, was placed at Valhús Bank by Hafnarfjörður, in 1928, and the above-mentioned first radio beacon was installed at Dyrhólaey.

The radio stations of Reykjavík and the Vestmanna Islands have been used by ships fitted with radio direction finders. By the aid of the latter station directions have been calculated with an absolute exactness at a distance of up to 180 miles. The experience thereby earned seemed to justify a grant of money for the construction of a radio beacon for this purpose. An arrangement was made with the Telefunken Company, Berlin, and the radio beacon was inaugurated on October 28th 1928. It is adjusted to issue signals during the first ten minutes of every hour all the year round, and in case of fog, the signals are issued for ten minutes three times an hour at even intervals.

For the transmitting two automatic charging plants have been arranged, each consisting of a single-cylinder benzine motor of 3 b.h.p., a dynamo 1.7 kw., a 110-volt. accumulator battery and two wooden masts, 45 and 19m., for the aerial.

THE LIGHTHOUSE APPARATUS AND BUILDINGS.

Up to 1910 only oil burners with wicks—1, 2 or 3—were used. Five of the lights were fitted with revolving lenses (4th or 5th order), all the others with lens drums or parabolic mirrors. After this time most of the new lights used dissolved acetylene in open burners or in incandescent. The optics are ordinary lens drums, of 3rd—6th order, but one light, the Dyrhólaey, has a revolving lens of 3rd order and 75-l. incandescent burner. In one of the above-mentioned five older revolving lights, the Siglunes, the light apparatus has been changed from oil to dissolved acetylene with a 25-l. incandescent burner. The gas apparatus are all flashing, from the Swedish Gas Accumulator, Ltd., the optics are furnished from Barbier Bénard & Turenne, Paris, from Chance Brothers, Birmingham, and from Gas Accumulator, Stockholm.

The buildings are made of concrete or iron, during the later years mostly of concrete, where materials are obtainable. The iron frames and lanterns were for the first years made in Denmark, Norway and Sweden, but since 1913 all of them have been manufactured in workshops in Reykjavík.

Gas Accumulators, Ltd., has erected a gas-filling station in Reykjavík, 1919.

The Lighthouse Administration possesses a small steamer for transport of all supplies for the lighthouses as well as the inspection service. The same steamer is also at the disposal of The State Telegraph Administration, for outlaying and repair of sea cables.

DAY MARKS AND BUOYS.

In addition to lighthouses, day marks have been erected for navigators. The lighthouses are all painted differently, or made distinguishable by some means or other. Formerly, sailors used to navigate by certain mountain peaks, cliffs, waterfalls, churches or other recognisable buildings, but very often the mountains are covered by clouds, and churches and other buildings destroyed or moved about, most of them being built of wood. Therefore about 80 special day marks have been placed along the coast and on many skerries, during the last decade.

Several harbour lights have been placed at the most important stopping places for mail boats and fishing vessels.

Very few floating marks have been set. If such marks are to be absolutely reliable, a ship must always be at disposal, which is yet too expensive. It will have to be done, though sooner or later, and by way of experiment a buoy has been set outside Hafnarfjörður. The setting of this buoy has presented various difficulties, the bottom being very hard and unfit for fixing the anchor, and besides the sea is extremely rough, and the buoy very bulky. This year a light-and-whistle buoy has been laid out on this place.

SHELTERS FOR SHIPWRECKED CREWS IN SKAFTAFELLSSÝSLA.

No general measures have been taken for rescuing shipwrecked crews on the coast of Iceland. Only in the most dangerous part, the sands of Skaftafellssýsla in the south, arrangements have been made, to save the shipwrecked who manage to get ashore. All such arrangements are now administered by the Lighthouse Department. The occasion was given in 1903, when a German trawler was wrecked on the sands, and the whole crew perished after they got ashore. The sands are completely desolate for miles and miles, and no habitation in sight. They had a roaring glacier-river on the left and another one on the right, with about 50 km. between them, a wall of glaciers in front, and the open Atlantic behind, and no means of getting in touch with the inhabitants on the other side of the rivers. The sands are full of glacier streams with quicksand; there is not a trace of vegetation, and no shelter against the weather or the sand-drift.

Numerous crews have lost their lives in these parts. Most of them belonged to foreign ships and did not realise that the current always tends to force the ship near the shore, which is very low, and therefore not visible at a distance. After the ship has struck, the crew, as a rule, try to get ashore, not knowing that they are much safer on the ship, where they

have a shelter, as the ship does not get shattered, but only sinks deeper in the soft sand, and where they have the chance of being seen and rescued by the inhabitants before long. Leaving the wreck, in those days, meant death, in most cases, but now a shelter has been built, by the German Consul Ditlev Thomsen, a wooden house, 3.75m. by 3.75m., containing provisions of food, clothes, medicine and various useful tools and instruments, and directions written in several languages, explaining what should be done.

A German crew of 13 was saved there in the winter of 1905-06. They stayed two days in the shelter, till they were seen and rescued from the nearest farms.

In 1911, The Steam Fishing Vessels, Owners and Underwriters Joint Amalgamated Arbitration Committee, of Hull, started a general subscription and had another shelter built at Máfabót, according to the advice of the Director of the Lighthouse Department. The shelter is maintained by the Icelandic Treasury. The shelter is wooden, and rests on six concrete pillars, to prevent it from being covered by flying sand. It has a 17m. high sea mark, and rows of pales all along the shore indicate the way from the most dangerous part of the coast to the shelters, many of them carrying waterproof boxes containing maps and directions written in Icelandic, Danish, English, German and French, stating the exact position and indicating the direction to be followed to the shelters, and what should be done. The provisions contained in the shelters are sufficient for the maintenance of a crew of 15 during a week. These shelters have proved very useful, having saved many crews from death.

LIGHT DUES AND LEGISLATION FOR LIGHTHOUSES.

The first light dues were imposed in 1878, at the inauguration of the Reykjanes lighthouse. Every vessel from abroad which arrived at the west coast, south of Snæfellsnes—warships, yachts and Icelandic fishing vessels excepted—should pay 0.40 kr. per ton, those which arrived at the northern part of the west coast, between Snæfellsnes and Cape Horn should pay 0.20 kr. This was intended to contribute to the maintenance of the lighthouses, but not to repay the original expenses. In 1909 this was changed into uniform light dues, to be paid in the first Icelandic harbour arrived at from abroad.

The total revenue of light dues was in the first year 6207.75 kr., while the working expenses of the one and only lighthouse amounted to 1685.84 kr. only. The original rule, that the light dues should cover the working expenses only, was not followed, the latter amounting to $\frac{1}{3}$ — $\frac{1}{2}$ of the revenues only, as an average.

By 1911 the light dues, which now amounted to 0.25 kr. per ton, had been imposed on yachts and Icelandic fishing vessels as well. The dues were raised to 0.40 kr. just after the war, except for yachts, which had to pay 0.15 kr. only. It has been changed several times since then, until now the dues are 1.25 kr. per ton.

A regulation for expropriation of sites for lighthouses, etc., exists, but it has very seldom been applied, the sites being in most cases situated on rocks or ground of no practical value to the owner. Besides, the farmers are nearly always pleased to have a lighthouse on their ground, because of the employment it affords them as lighthouse keepers, etc.

THE MANAGEMENT OF THE LIGHTHOUSES.

After Parliament had sanctioned, in 1877, that lighthouses were a separate affair for Iceland, the next thing to do was to choose some kind of Chief Direction, but as there was no Icelandic expert at that time, and it was too expensive to engage an expert for one lighthouse, and affairs were assigned to the Governor-General. He sent a man to survey the lighthouse once or twice a year. In 1897, when the lighthouses built at Garðskagi and Grótta, the Danish Lighthouse Department, who was responsible for the enterprise, set the condition that a man with some special knowledge of lighthouses should be engaged. The first official inspector was the head master of the navigation school, who went to Denmark for research before accepting the appointment. This inspection was only for the then existing lighthouses, while the later additions were entrusted to the Sheriffs, i.e., more or less without inspection. This could not continue, with the increasing number of lighthouses all around the coast, and in 1910 Th. Krabbe, State Engineer, was appointed inspector of all the lighthouses. An assistant engineer was appointed in 1914, and at the same time a Lighthouse Office was established as a separate Department, of which Mr. Krabbe was appointed Director. The Department now possesses a storehouse, a workshop and a laboratory.

At first the inspection journeys were gone through on horseback, but with the increasing number of lighthouses, this method grew too exhausting and expensive, and it was impossible to transport materials and supplies for lighthouses and new constructions by mail boats or hired boats. The sea is often very rough round the lighthouses, so the ships have to wait for days before they can disembark the cargo. This caused many troubles, and finally a 19.26 tons motor boat was bought for the purpose in 1916. This was a great improvement on the old conditions, but she was anything but comfortable for travelling, and in the long run she proved too small. She was sold, therefore, in 1921, and for the following two

years a small steamboat was hired, during which time an acceptable offer of a serviceable steamer was sought. This was found in Norway, and a steamer of 103 tons was bought at 20,000 kr. She was originally an English trawler, and later a Norwegian salvage steamer. She arrived in June, 1924, and has been used by the Lighthouse Department, and by the Telegraphic Service as well every summer since then. She was equipped with a wireless receiver some years ago, and in 1928 a sender has been added.

In 1914 the Government started publishing an annual calendar for sailors, containing a complete list of the lighthouses, but gradually it grew too bulky to be published there according to international agreements, so it was published as a separate pamphlet, to which a supplement has been added later. All changes, etc., are made known to sailors and other interested parties by advertisements in the hebdomedary of the legal notifications, and provisionally shipping companies are notified immediately. In case of emergency, when a lighthouse ceases to function or a buoy goes adrift, the fact is broadcast morning and night in connection with the weather forecast.

LIGHTHOUSE KEEPERS.

Most of the lighthouse keepers are appointed by the Director of the Lighthouse Department with the sanction of the Ministry of Trade, but six of the most important ones are appointed by the Minister of Trade and paid according to the regulations. The salary varies from 150 to 2,000 kr. annually, with the addition of a certain percentage according as the current prices compare with pre-war prices, and they have certain advantages: a strip of land to cultivate, free lodgings, fuel and light, etc.

The Reykjanes lighthouse is the only one that has to be watched all the time, so it has an assistant keeper as well, but the other revolving lights have to be looked after every three or four hours, and most of them have an alarm bell that rings if the light goes out.

The keepers of the gas lighthouses are the nearest farmers, the functioning of the lighthouses being extremely simple. They all keep a diary of everything that concerns the lighthouse. Several attempts have been made at composing general regulations as to the work demanded of the lighthouse keeper, but they have always been out of date before they were put into practice, the light apparatus being improved continuously, and, besides conditions differ considerably in each case. At present, consequently, there are no such regulations, and each keeper is instructed as to the work at his particular lighthouse. Practically all of them have done their work very conscientiously.

According to the old regulations, the lighthouses are in function between half hour after sunset and half hour before sunrise from August 1st to May 15th. These were followed till 1927—except in 1918, when no gas or petrol was obtainable, and the lighthouses were extinguished on April 1st, and in the autumn no light was lighted till August 20th. In 1927 the time was prolonged for all lighthouses south of 65½° to July 15th—June 1st, while the time for those north of the above latitude remained as before.

THE RELIEF FUND FOR ICELANDIC LIGHTHOUSE KEEPERS.

Some of the lighthouses are frequented by visitors who come out of curiosity to see the inside, especially while they are new. These visits were often a nuisance and a considerable waste of time to the keepers, who had to leave their work to show the visitors round, so in order to reduce the number of visitors, and for the benefit of the lighthouse keepers, some regulations were made in 1910, according to which the admission fee is 0.25 kr. The run of visitors decreased considerably as a consequence, but the perquisites of the lighthouse keepers were inconsiderable, as they objected to collecting the fee, especially when friends were concerned. Therefore the distribution of the fees was considered to be more just, if a general fund was formed; it was easier for the keepers to collect the fee from friends, when it was not for their personal benefit. The fund, however, was too small to be of any use, so by a law of 1919 every lighthouse keeper was bound to contribute by 2 per cent. per annum of his pay, and the State contributes by an amount equal to the total contributions of the keepers. The fund is administered by the Director of the Lighthouse Department and two lighthouse keepers, who are authorised to distribute 50 per cent. of the annual revenue to indigent lighthouse keepers or their widows and children under age. After the fund has increased to 10,000 kr., 60 per cent. may be distributed, with increasing percentage up to 90 per cent. when it passes 40,000 kr. In January, 1928, the fund amounted to 11,157.39 kr., after 3,900 kr. had been granted to lighthouse keepers and widows.

SUMMARY AND PROSPECTS.

During the 50 years that have elapsed since the construction of the first lighthouse in Iceland, the works completed are the following:—Fifty-one lighthouses, one radio beacon, one fog signal station, one light-and-whistle buoy, a number of day marks on the coast, and thirty-five harbour and range lights.

Very little was done during the first 20 years, more during the next 10, but the last two decades have brought a rapid development.

The present state of affairs is fairly decent. We are certainly far behind other seafaring nations, but then they started their lighthouse system some 400 years ago, while ours is only 50 years old. They have rich populations and sufficient funds; they have realised the necessity and acquired plenty of experience, while we have little of all these.

The progress leading up to the present state of affairs, then, has been satisfactory, comparatively, but to the question how much still remains to be done, the answer is, that it can never reach a state that leaves no scope for addition and improvement. The possibilities for expansion of the system are practically unlimited. The demands increase in proportion to the improvements, so there will always be a wide scope for improvements.

Much remains to be done before our lighthouse system can compare favourably with the most advanced ones. The next things of importance to be done are the erection of a landing lighthouse for the east coast, with a fog siren and radio beacon, eight to ten ordinary lighthouses on the outlying points of the north and east coast, and numerous smaller ones in the fjords, several fog sirens and many buoys of different kinds, ten to twelve radio beacons on outlying points, and perhaps some in the fjords as well, and many old lighthouses need improvement. All this, perhaps, seems too much for our small means, but it is not; it can be done, by degrees, when the light dues are all used for the maintenance and development of the lighthouse system, and when it is employed reasonably. If this is done, our lighthouses can be administered so that we need not be ashamed of them. Of course we may take for granted that production, commerce and navigation will increase rather than decrease. Those who firmly believe in a prosperous future for Iceland, will have no doubt that we can, even in this, keep pace with the others and achieve respectably, if we will.

Canadian Notes.

NEW CANADIAN MAPS.

The High Commissioner for Canada in London has received from the Natural Resources Intelligence Branch of the Dominion Department of the Interior of Ottawa copies of the following new maps on the scale 35 miles to 1-in.:—

1. The Province of British Columbia.
2. Quebec and the Maritime Provinces.
3. The Provinces of Manitoba, Saskatchewan and Alberta.

Copies of the maps in question will be obtainable shortly by persons interested on application to the High Commissioner for Canada, the Canadian Building, Trafalgar Square, London, S.W.1.

WELLAND SHIP CANAL NEARING COMPLETION.

According to a statement made by Mr. Alexander J. Grant, Engineer-in-Charge of the Welland Ship Canal, printed in *The Canadian Engineer* of December 18th, construction of the canal is gradually being completed and present expectations are that the waterway will be open for traffic in July, 1930. Progress during the past year has been most satisfactory, the amount spent being approximately nine million dollars, bringing the total expenditure on the canal down to the end of November to \$99,000,000.

The new canal between Welland and Port Robinson will be placed in service about July of next year, when navigation will be diverted from the enlisting canal to the new ship canal. Navigation is now being permitted to pass over the syphon culvert at Welland, which carries the water of the Chippawa Creek beneath the bed of the ship canal, and following the spring freshets the waters of the Creek will be diverted from the present aqueduct to the culvert.

The steel gates on the various locks will be completed by August next, and the great majority of the twenty bridges will also have been completed by that time.

NEW TRAFFIC RECORDS ON CANADIAN CANALS.

The immense volume of grain moving down this year from the Great Lakes and through the Welland and St. Lawrence Canals has resulted in record total figures on the Canadian canals. The total tonnage handled on the Welland Canal during 1928 was 7,439,617 tons, an increase of 192,158 tons over 1927. On the St. Lawrence canals the tonnage was 8,411,542, a more marked increase in favour of the present season, the total traffic to the end of December being heavier by 498,590 tons than in 1927.

CANADIAN NATIONAL RAILWAYS EARNINGS.

The official monthly financial statement of the Canadian National Railways reports increases in both gross and net earnings during the eleven months ended November 30th, 1928.

Gross earnings amounted to \$253,030,877, an increase of \$26,092,468, or 11.50 per cent. over the earnings for the same period of 1927 amounting to \$226,938,409.

A gratifying feature of the statement is that the net earnings for the period under review were \$53,549,291, an increase of \$12,089,584, or 29.16 per cent. over those for the 11-month period of 1927 at \$41,459,707.

In November gross earnings of the National System were \$26,558,312 in comparison with \$24,131,102 in November, 1927, an increase of \$2,247,210 or 10.06 per cent. Net earnings for November, 1928, at \$7,139,180, show a gain of \$266,428 or 3.88 per cent. over November, 1927, at \$6,872,752.

NEW CANADIAN RAILWAY BRANCH LINE IN SASKATCHEWAN.

An official announcement has been made at Montreal of the intention of the Canadian National Railway Management to seek Parliamentary sanction for the construction of a new branch line from Aberdeen to Melfort, both being in the province of Saskatchewan. The proposed new branch would bisect a large area of well-settled country between two existing branches of the Canadian National Railways and would provide a shorter route than at present for traffic between the southern districts of Saskatchewan and Alberta and the Hudson Bay Railway. The new line will give a practically direct route to Melfort from Saskatoon, and presents possibilities for the opening up of the north-eastern districts of Saskatchewan by the eventual extension of the Melfort-Ridgedale branch direct to The Pas.

HUDSON BAY RAILWAY PROJECT.

In view of the expected completion before the end of this year of the Hudson Bay Railway line from The Pas, Manitoba, to Churchill, the following data relative to navigation in the Bay and Strait may be of interest to business men in Great Britain.

An ice-breaking steamer "Montcalm" passed through Hudson Strait during the first week of July last. A commercial vessel, the "Larch," engaged in transport work for the Department of Marine and Fisheries between Halifax, N.S., and the air-posts in the Strait, reached Burwell on July 24th, and could have gone on, but was obliged to stay at Burwell until the 27th, when it passed Nottingham Island at the west end of the Strait.

The ice went out at Churchill on June 19th, and Hudson Bay off Churchill was clear by July 10th. Churchill Harbour itself continued open until about the end of November, and as late as November 17th there was no ice in sight in any direction from Nottingham Island, which would indicate that the Strait was also navigable up to the end of November, and probably later. The period of greatest difficulty in the Strait will likely be found to be late spring and early summer, due to ice from Fox Channel.

A good deal of useful information in connection with the navigation of Hudson Bay and Strait was secured by an aerial expedition established by the Department of Marine and Fisheries at three points on Hudson Strait during 1927, and this aerial reconnaissance was continued until recently, when the members of the expedition, together with their equipment, returned safely to Ottawa. The report on this expedition is not yet available, though expected shortly. As a result of it, steps will be taken by the Marine Department to establish at strategic points throughout the Strait modern aids to navigation, including direction-finding devices, which will be of invaluable assistance to navigators in those northern waters, and will add greatly to the navigating possibilities of the route.

To the end of the fiscal year ended March 31st, 1928, \$20,780,248 had been spent on the Hudson Bay Railway, since which date, up to November 30th, an additional \$2,606,000 has been expended on the railway. To March 31st, 1928, \$897,950 had been expended on the work at Churchill, and during the present fiscal year, to November 30th, the expenditure there has been \$2,561,000, so that during the year 1928 more than \$5,000,000 was spent on Hudson Bay Railway and port development.

PORT FACILITIES AND CHARGES IN DANISH PORTS.

The Department of Overseas Trade has received from His Majesty's Consul at Copenhagen reports on facilities and charges at the following Danish ports:—

Korsor, Horsens, Randers, Frederikshaven, Nyborg, Fredericia, Sonderborg, Lemvig, Struer, Aarhus, Esbjerg, Nakskov, Nykjøbing (Falster), Odense, Svendborg, Thisted, Copenhagen, Aalborg, Kolding, Elsinore (Helsingør).

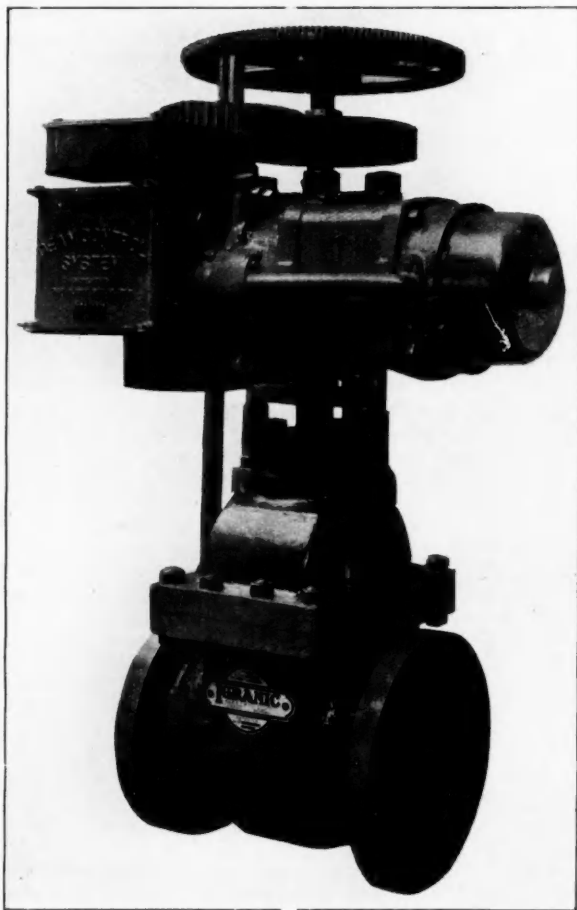
The information furnished comprises disbursement accounts for steamers discharging in every case, while particulars are also given, as far as possible, of charges incurred by goods landed at Korsor, Randers, Horsens, Aarhus, Esbjerg, Odense, Aalborg, Kolding and Copenhagen.

Memoranda summarising the information supplied have been forwarded to steamship owners and brokers on the Department's Special Register, and copies of the information regarding any of these ports may be obtained by companies of British origin, capital and control upon application to the City Office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

Harbour Engineering Notes.

THE AUTOMATIC CONTROL OF LARGE VALVES.

Considerable progress has been made since the war in the application of automatic electric control to the functioning of large valves, and it is now possible to operate a valve of any size or a group of valves from practically any convenient point, or from a centralised point. In many cases periodic closing and opening of valves for test or other purposes is necessary, and, this work is greatly facilitated where electric control is installed.



Dean Valve Control fitted to Hopkinson Valve.

The best-known system is the Dean, in which the valve control unit consists of a driving motor, reduction gears, a limit switch and a pawl. These parts are all assembled in one case, while the driving motor is totally enclosed and is steam and splash proof. The motor, which has a very high starting torque, is connected to a system of combination worm and planetary gearing to effect the necessary speed reduction. The motor has a normal speed of about 4,000 r.p.m., while that of the slow speed shaft is 100 r.p.m.

The motor shaft is coupled to the worm shaft by means of a clutch, both motor and worm shafts running in ball bearings. The worm shaft drives a worm gear which is keyed to a sleeve, the other end of which constitutes the sun of the planetary gear system. The three planet pinions revolve on studs which are forced into a flange forming part of the slow speed driving shaft. These pinions mesh into an internal gear which is the outer member of the planetary gear system.

The internal gear fits into a machined recess in the casing, and revolves freely on its bearing. It is provided on its outer surface with a peripheral channel containing a stop which engages a restraining pawl when the latter is moved into the clutch position by the action of a solenoid. The latter straightens a holding toggle when the circuit is closed, and holds the pawl rigidly in place.

When the operating handle is turned, it is held in either the open or closed position by a no-voltage release solenoid working in opposition to a spring. Turning the operating handle connects the motor circuit to the line, and at the same time energises the pawl-operating solenoid, throwing in the restraining pawl which arrests the internal gear and causes the slow speed shaft to drive the valve gate or disc. After the slow speed shaft has made a few revolutions a second light appears indicating that the valve has started either to open or close, as the case may be, and two lamps, red and green, remain visible on the central board while the valve gate is in an intermediate position. When the valve gate reaches the end of its travel, the proper limit switch functions to disconnect the motor from the line circuit. At the same time, the no-voltage release and the pawl operating solenoid circuits

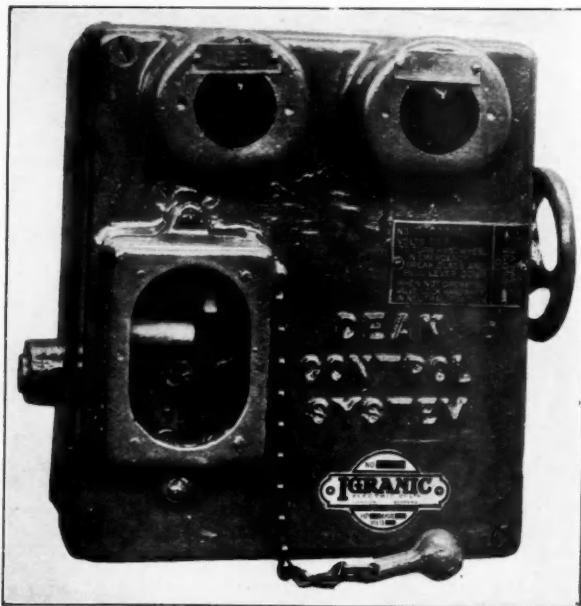
are both opened. The former action results in the operating handle automatically returning to the neutral position, while the latter action causes the slow-speed shaft to be released from operation by the motor, worm and internal gears. Either a red or a green lamp then remains alight on the control board, depending upon whether the valve is open or closed.

In operation, when the motor is started by closing the switch, the internal gear revolves until the stop is brought up against the pawl, suddenly arresting the movement of the internal gear and producing the starting blow which unseats the valve. With the internal gear stopped, the slow-speed shaft revolves and raises or lowers the valve stem, according to the working conditions, until the limit of travel is reached, at which point the corresponding limit switch disconnects the motor from the circuit and the valve comes to rest.

The switches are operated by means of a train of reduction gears driven by the slow-speed shaft, the gears being contained in the casing and running in oil. Extremely accurate limit adjustment can be obtained. When the valve is firmly seated or is fully opened, as the case may be, the proper switch opens the solenoid circuit, thereby permitting the restraining pawl to be quickly withdrawn by spring action. At the same time the motor is disconnected from the circuit. When the restraining pawl is withdrawn, the internal gear is free to revolve with the planetary gear system, thus absorbing the momentum of the motor and bringing it to rest. The slow speed shaft and the slow moving valve parts come to a stop immediately without jamming the valve. The shape of the restraining pawl is such that should the spring be broken or be put out of action, the driving strain will force it out of engagement with the internal gear if the solenoid is de-energised.

The valve can be operated by the hand wheel at any time, without disturbing the electric drive or control. The limit switches, being operated by the slow-speed shaft, are always directly connected to the moving parts of the valve. Any hand operation results in the limit switches automatically assuming positions corresponding to that of the valve gate, thus permitting power operation to be taken up again at any time without further adjustment or check of the apparatus. This is a valuable feature of the Dean system.

Relay panels are equipped with an additional contact which permits the closing to take preference over opening; that is the valve can be closed from one station even if another station is set to open it. This is essential when emergencies occur and confusion is likely to result. In the case of an accident, it might be impossible to gain access to one control station, e.g., in the case of a burst main, so that the valve can be closed from another.



Master Control Station for Dean Valve Controller (cover on).

Such a system, as will be seen, simplifies and reduces to the minimum the labour involved in opening and closing large valves. All the switches for the valves, whatever their number or size, may be grouped on a centralised board, where they are constantly under the eye of the engineer in charge, while the state of the red or green lamps indicates at a glance the exact position of all the valves.

Recently, a refinement of the above system has been introduced in which small valves from 1-in. to 6-in. may be automatically controlled. This latter development is known as the Ao valve, and is designed especially for the automatic regulation of temperature of gases and liquids. It can be operated by means of conveniently-placed push buttons, or automatically by float switches, temperature controlling devices or pressure regulators.

Where push button control is to be used, and the valves are scattered throughout a large building, the push button station for each valve can be placed on a centralised control board, in the same way as the control switches for the Dean system, the push button station being equipped with two lamps, red and green, to indicate whether the valve is open or closed. When it is in an intermediate position, both lamps are alight.

FUEL ECONOMY IN DOCKYARD POWER PLANTS.

During the past few years a good deal of attention has been paid to the question of the efficiency of steam generating plants, not only from the point of view of securing higher evaporative efficiencies, but also from the standpoint of utilising low-grade and cheaper fuels, and it has been shown that these fuels, when pulverised and burnt in a properly-designed burner, can be employed to produce equal, often higher, efficiencies than those afforded by high-grade coals burnt by the older methods. In fact, it has been ascertained that, when using coals of equal calorific value, the work of five stoker-fired boilers can be easily carried out by four of the same capacity fired with pulverised fuel. Similarly provided a suitable pulverised fuel installation is selected, the maintenance charges are on an average 30 per cent. lower for powdered coal than for stokers.

Pulverised fuel has had its advocates, like other comparatively new processes, who have given little thought to the proper selection of a process having the special conditions of the power house in view, and, in consequence, powdered fuel plants which have been found eminently suitable for some installations, have proved prohibitive in cost for many of the smaller plants. On the other hand, while the first cost of such an installation is higher than that of a stoker-fired plant, the economies possible are so great as to leave no doubt as to which is the more economical in the long run.

Harbour engineers have the choice of three methods of preparing, transporting and burning pulverised coal, which are characterised by the manner in which the coal is dealt with after it has been pulverised, and are known as—(1) The central or indirect system; (2) the unit or direct system; (3) the individual storage system. The central system is employed where the coal is required to be crushed in a central plant, and then transported by compressed air from a storage bin to various furnaces or boilers as required. The unit system is used where it is required to eliminate all storage, and blow the coal directly from the pulveriser to the boiler or furnace as soon as it is ground. The individual storage system grinds the coal at or near the boilers, and the coal is collected from the pulveriser into a hopper, from which it is fed to the burners. Of these systems, the individual storage system will probably best meet the needs of most harbours, as it is the most economical and flexible for application in plants of average size. It combines the advantages of the central and unit systems, in that the pulveriser can be run at its maximum output independently of the consumption of the furnaces.

The essentials of a pulverised fuel plant suitable for colliery use consist of (1) a preliminary crusher; (2) a magnetic separator; (3) a pulverising unit; and (4) a burner.

Almost any type of preliminary crusher which will reduce run of mine coal to a size conveniently handled may be used, e.g., a Blake or other type of jaw crusher or a gyratory, depending upon the size and volume of coal to be dealt with. In many cases the magnetic separator may be dispensed with, according to the type of pulveriser being used. For colliery power plants, a ball mill will be found very suitable on account of its low maintenance and running costs. From the mill the pulverised coal is delivered by means of a screw conveyor to the hopper, which feeds it to the burner.

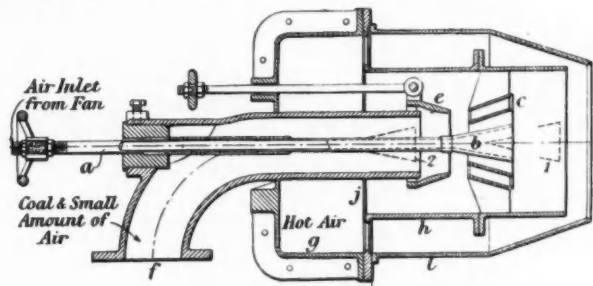


Fig. 1.

Many of the earlier difficulties met with in the application of pulverised fuel to steam plants were due very largely to wrongly-designed equipment, and also to an imperfect understanding of the exact conditions essential for successful pulverising, and for the maintenance of the proper admixture of coal and air at the burner itself in order to ensure perfect instantaneous combustion. For example, a very serious drawback of some installations carried out is the fact that, owing to the design of the burner, the combustion chamber, in which the powdered fuel obtains the bulk of the oxygen required for its combustion, has to be extremely large in order to ensure complete combustion without slagging, otherwise water-cooling has to be adopted for the walls. This involves

the disadvantages of possible leakages, waste of heat and expense in maintenance and repairs. Such systems could not be applied to existing steam plants, especially the smaller ones, without considerable additions and alterations being required, which, in many cases, would render conversion from hand or stoker-firing an expensive matter for the harbour management.

Consequently, engineers have devoted considerable time to the evolution of a system in which the air supply can be made adjustable to the needs of the furnace and under complete control.

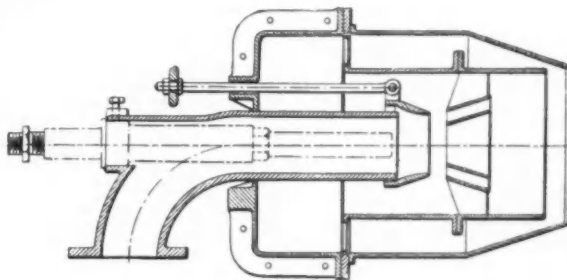


Fig. 2.

Such a burner is the one illustrated in the diagrams (Buell), which can be instantly adjusted to admit either surplus air or to reduce the amount below that necessary to secure complete combustion. Such a method of air control means that no matter how long a grade of coal is being burnt, the whole of the carbon can be consumed. In actual practice, it has been shown that coal varying from 5 to 30 per cent. volatile can be used successfully, and anthracite, semi-anthracite and bituminous coals may all be dealt with efficiently.

In the Buell burner the air for combustion is supplied in three separate streams, two of them from the fan additional to the propelling air, and the third an induced flow from the stokehold. This arrangement obtains in both the dispersive and the non-dispersive types.

The dispersive burner (Figs. 1 and 2) is the most characteristic, and the construction can be easily followed from the sections, "F" is the curved fuel pipe, the coal being discharged through an annular space round the internal primary air inlet "A," this space being greater or less according to the position of the hollow cone "B," which forms the end of the inlet pipe. Outside the fuel inlet are two concentric casings "H" and "I." The inner one "H" carries a pair of conical rings "C," expanding from the direction of the jet, while the outer casing "I" terminates in a conical portion contracting against the direction of the jet. The external primary air supply from the fan is introduced through the annular space between "H" and "I," either from a continuous chamber "G," or, more naturally, through four pipes connected by a common ring. The secondary air, induced by the injector action of the coal stream, enters through louvres at "J," into the space between the inlet pipe "F" and the casing "H." Sometimes the external primary air pipes function as secondary air inlets, in which case the louvres are closed.

The operation of the burner can be followed from Fig. 1. The internal primary air inlet "A" is adjustable horizontally by a screw motion controlled by a hand wheel. The hollow cone B is made with a solid central cone so that the jet of air issuing from it is hollow, like the coal stream. When the cone is in the extreme forward position (1), the jet of coal dust has been opened out only a little way by the internal primary air jet, when it meets the converging stream of external primary air at the mouth of the casing H, the two streams striking one another at an acute angle. The result is a comparatively long flame carried between two sheets of eddying air. When the cone B is drawn back to the extreme rearward position (2), the coal stream is opened out immediately it leaves the inlet pipe, to such an extent that it impinges on the edge of the casing H, striking in its course the rings C, which break it up and assist in mixing it with the air. At the outer edge of the casing H, the coal stream, which is then spread over seven and a half times its original area, meets with the external primary air at a much less acute angle than in the former case, and the destruction of the velocity effected by the converging currents is much more marked.

Under these conditions there is a region of combustion immediately outside the mouth of the burner, where a turbulent effect is very noticeable. The velocity of the coal and air jets being absorbed in creating this disturbance, the resultant flame is short and "bushy," with practically perfect combustion. The shape of the flame can obviously be varied between the two limits by suitably adjusting the cone between positions 1 and 2.

An important feature of the burner, shown in Fig. 1, is the conical ring E over the end of the coal inlet pipe. By means of this it is possible to change the direction of the flame from a strictly axial one to another at a considerable angle to it. The ring is pivoted in the middle, and can be tilted round this axis by the sliding rod shown, the fuel stream being diverted either upward or downward, as required.

Some interesting tests were carried out recently with three different types of slack, the figures being as shown in the table.

TABLE OF TESTS.

| FIRST TEST, SLACK COAL A. | | | |
|--|----------------------|----------|---------------|
| | Chain Grate Stokers. | | Buell System. |
| Boilers | B. & W. watertube | The same | |
| Heating surface, square feet ... | 3240 | 3240 | |
| Number | 3 | 5 | |
| British Thermal Units of coal as fired | 11856 | 10370 | |
| Coal consumed per hour, lbs. ... | 2456 | 1175 | |
| Analysis of coal:— | | | |
| Fixed carbon, per cent. ... | 49.4 | 49.46 | |
| Volatile matter, per cent. ... | 34.1 | 30.75 | |
| Moisture, per cent. ... | 2.4 | 9.4 | |
| Ash, per cent. ... | 14.1 | 10.39 | |
| Total water evaporated per hour, from and at 212 deg. Fah. ... | 7.7 | 9.0 | |
| Factor of evaporation ... | 1.08 | 1.18 | |
| Efficiency of boiler and superheater | 64 | 83 | |

In the second test, on the same boilers, a slack coal was burned on four boilers with chain grate stokers and five with the Buell burner, the water evaporated per lb. of coal from and at 212 deg. F. being 8.4 and 10.5 respectively, and the overall efficiency being 66 and 85. In the third test, the water evaporated per lb. of slack from and at 212 deg. F. was 7.4 with chain grate stokers (four boilers) and 10.4 with the Buell burner (five boilers). The overall efficiency was 57 with chain grate stokers and 83 with the pulverised fuel system.

NEW GERMAN PLANT FOR THE LIQUEFACTION OF COAL.

The economical production of oil from coal without incurring a number of byproducts which may be difficult to dispose of has exercised the minds of scientists for the past twenty years, and the result has been the development of a number of so-called "liquefying processes," such as the methanol process worked by the Badische Anilin und Soda Fabrik, Bergius and others. In the methanol process, hydrogen is combined with carbon dioxide in the presence of a catalyst. The latest process to be operated on a commercial scale is that of Bergin, and its chief interest lies in the fact that it is worked without catalysts, and it has also the advantage that better results are obtained from a low-grade coal than from one containing, say, 85 per cent. of carbon. In fact, the Bergin process is said to be working very well in the new plant of the Bergin Werk at Mannheim-Rheinau.

In the Bergin process the coal is crushed to particles of about 1 mm. and is then mixed with a small amount of ferric oxide and about 40 per cent. by volume of the coal of a heavy oil. This mixture is made into a paste and is pumped into a container at a pressure of about 150 atmospheres. Here the mixture is heated to 470 deg. Cent. and stirred continuously. Hydrogen is supplied to the vessel through a separate pipe. The mixture then flows to a second vessel, from which the liquid and gaseous products are withdrawn and cooled, the pressure being released.

The recovery from one ton of coal by this process is as follows: 159 kilos of light oils, 200 kilos of Diesel engine oils, 60 kilos of lubricating oils, 80 kilos of furnace-heating oils—a total of about 490 kilos of oils, and about 210 kilos of gas.

It is estimated that the cost per ton of finished product is 92 marks, which is capable of reduction. The value of the finished products are variously estimated at from 140 to 190 marks. The commercial plant at Mannheim-Rheinau can deal with 1,000 kilos of raw coal per 24 hours.

REINFORCING WORN RAILWAY CROSSINGS.

For some years many of the principal railway systems both here and abroad have adopted the practice of reinforcing or building up the worn parts of railway crossings by means of electric welding, and in one case a saving averaging £20 per crossing was effected over the cost of a new crossing. Though much valuable material may be salvaged in this way, a still further economy is found to be effected by reinforcing these crossings in situ instead of removing them to the shops for the purpose, and, indeed, many railway engineers regard the saving effected by repair in situ of far more value than the economy in material, in that time and labour required for removing the crossing to the shops, and the delay and diversion of traffic is rendered unnecessary—very appreciable items, especially outside main line termini.

As a result the practice is growing of repairing these crossings between the passing of trains, the necessary labour in such a case being a welder, a grinder and a look-out man. As to the economy effected in material it is found that, whereas a crossing outside a main line terminus, where constant braking and acceleration takes place, is limited to about four years, reinforced crossings are still giving good service after five years. As far as cost is concerned, it is found that the expenditure on reinforcing a crossing in situ works out at about £4, this covering electric current, electrodes (usually carbon steel) and labour, that is to say, a welder, a grinder and a look-out man. By comparison, a new crossing costs about £15, and the total cost covering installation may be anything from £25 upward. The initial cost of a manganese crossing is about £110,

Recent Legal Decisions.

The ordinary duty of care which is incumbent on every person under the common law, and breach of which gives rise to an action of damages against a person who has neglected to observe such duty has, in many cases been supplemented by statutory regulations, neglect of which is in itself evidence of negligence. The interesting question of how the statutory regulations stand in regard to the common law duty and vice versa, was considered in the recent case of *Taylor v. Cairn Line of Steamships, Ltd.*, which we mention here, as the statutory rules in question refer to dock operations.

A workman was accidentally killed while unloading a ship belonging to the defendants, and his representatives sued the shipowners for damages. From the evidence it appeared *inter alia*, that the deceased was employed in unloading sacks of grain stored in the 'tween decks hold of one of the defenders' ships berthed at Leith. The hatch which gave access to the 'tween decks hold was situated immediately above the hatch which gave access to the lower hold, the depth of which was 20-ft. The coamings of the lower hold were less than 2-ft. 6-in. in height, and the hatch was at the date in question unfenced. Before commencing work the stevedore's employees, of whom the deceased was one, covered the lower hatch with planks in order to provide a platform from which they could attach the grain sacks to the sling let down through the upper hatchway. Proper and suitable planks for the hatchways were supplied by the owners of the vessel and were available, but the stevedores put some of the planks in their wrong places, and the deceased fell into the lower hold through an opening caused by the slipping and tilting of one of the planks. None of the ship's officers took any part in the adjustment of the planks.

Section 79 of the Factory and Workshop Act, 1901, provides for the making of regulations by the Secretary of State in regard to dangerous manual labour.

The Docks Regulations, dated 6th March, 1925 (S.R. & O. 1925, No. 231), provide, with regard to the processes of loading and unloading a ship at any dock:—"Duties"—"(d) It shall be the duty of every person who, by himself, his agents or workmen carries on the processes, and of all agents, workmen and persons employed by him in the processes, to comply with Part IV. of these regulations. Provided that while the processes are being carried on, it shall be the duty of the owner, master or officer in charge of a ship to comply with regulation 34, so far as it concerns those hatches which are not in use and which during the processes have not been used and are not about to be used for the purpose of the processes."

Part IV., Regulation 34 (a) provides:—"Where there is more than one hatchway, if any hatch of a hold exceeding 5-ft. in depth from the level of the deck in which the hatch is situated to the bottom of the hold is not in use for the passage of goods . . . and the coamings are less than 2-ft. 6-in. in height, such hatch shall either be fenced to a height of 3-ft. or be securely covered."

Regulation 35 provides:—"No cargo shall be loaded or unloaded by a fall or sling at any intermediate dock unless either the hatch at that deck is securely covered or a secure landing platform of a width not less than that of one section of hatch coverings has been placed across it . . ."

The pursuers maintained, *inter alia*, that liability attached to the defender's (a) at common law, in respect that the planks provided to cover the hatch were not suited for their purpose and constituted a trap when placed in position, and (b) through breach of statutory duty, in respect that it was the duty of the officer in charge of the ship in accordance with Regulation 34 (a) to have had the hatch in question either fenced or securely covered, as this hatch was not in use for the purpose of unloading.

The Court gave judgment for defendants, *holding, inter alia* (1) that Regulation 34 (a) imposed no duty on the defenders to fence the hatch or render secure that hatch cover in question; (2) that Regulation 35 imposed the duty of securely covering the hatch on the stevedores only; and, if there was a case at common law, (3) that at common law there was no liability attaching to the defenders in respect that (a) proper sections of cover for the hatch had been available to the stevedores and (b) the danger causing the accident had been obvious and had been recklessly disregarded by the deceased.

An observation by one of the judges may be quoted: "As regards the alleged common law duty I am for my part very averse to setting up, side by side with a statutory set of regulations which both (a) define and (b) assign duties in such a matter as this, a set of, it may be, differing common law rights and duties, unless it be absolutely necessary to supply a *lacuna* in the statutory regulations. I am not prepared to say that in no possible case could common law duties in the matter overlap statutory regulations, but I find in this case that the statutory regulations completely and adequately cover the whole matter, and, if the statute is loyally and practically obeyed, then I think all duties stateable or alleged at common law have also been discharged."

The Port of Civitavecchia.

By Lt.-Col. SILVIO LOMAZZI, Captain of the Port.

I. HISTORIC OUTLINE.

THE port of the antique name of Centumcellae, now Civitavecchia, is undoubtedly the most important port of Central Italy, and is one of the few that still maintain in part, in perfect condition, remains of the Roman period.

It was built under Trajan, to provide Rome with an ample and safe port, the others being too near the Tiber and subject to frequent and damaging invasions. The construction was commenced, as far as can be ascertained, about 102 or 103 A.D., by the famous architect Apollodoro.

being beaten with waves coming from the west and N.W. and the changing from S.W. to W. and from S. to S.W.

When the Kingdom of Italy was formed, and the Pontifical State annexed, the calmness of the inside waters was assured with the closing of the southern entrance by prolonging the Trajan breakwater, which was also lengthened in the opposite N.W. end by about 400 metres.

This work also formed a new commercial basin on the outside of the mole of the Bicchiere (New Darsena), and an outer port facing the N.W. winds, which are infrequent, and in part intercepted.



Discharging Coal by hand.

The port of Centumcellae, around which quickly sprung up and flourished the town of the same name, became, in fact, the real port for Rome, having rendered useless those near the mouth of the Tiber; it served Rome during the Empire, it was the military stronghold, and the centre of trade with the Orient, which after the 3rd century was already finding difficulty in invading the other neighbouring ports: it suffered the consequences of the Barbarian invasions, passing under the dominion of the Ostrogoths and Byzantines until in the 7th century it passed under the Papal Government.

In the year 820 it was attacked and taken by the Saracens and the inhabitants of Centumcellae were forced to fly into the mountains, near Allumiere, where they founded the city of Leopolis, in honour of Pope Leo IV., who consecrated the town.

In the year 889, when the Saracens had retired, after having destroyed Centumcellae, and damaged the port, the inhabitants of Leopolis decided to return to the old town, and rebuild it on the ruins: it was from this that the city, with its antique origin and traditions, derived the name of Civitavecchia (Old City).

Following this, after having been subject to Feudal domination, and the conflicting dominations of the various Italian princes, in conflicts between them and the Church Authorities, which conflicts lasted from the second half of the 11th Century, until after 1400, the town once more under Papal domination enjoyed relative peace, and the movement of the port increased considerably.

The dawn of the Renaissance found the port of Civitavecchia in condition to serve the Popes, who, appreciating its efficiency, employed famous artists and enriched and beautified the town.

The Port of Civitavecchia, restored under Pope Urbano VIII, in 1634, possessed two breakwaters; one on the North, called the Lazzaretto, and the other on the south of the Bicchiere, both being converging, and an isolated dam called the Trajan breakwater, used to defend the entrance to the harbour.

The port had therefore two entrances, one at the north side and one at the south, which offered a safe entrance to sailing vessels, in any wind, though the internal water was disturbed,

Of the antique constructions Civitavecchia still possesses almost intact, the central part of the old breakwater built by the Emperor Trajan; the Old Darsena, the two terminal towers of the mole of the Bicchiere and the Lazzaretto, Roman constructions, used for fortresses during the Pope's period. Of the Papal Government there remains the lighthouse, the arsenal (the work of the sculptor Bernini), the quay with fountain, and the stairway (built by Vanvitelli), the gateway called Porta di Livorno, the Darsena, the Governor's palace, the Lazzaretto, the fortifications of the bastions of the Darsena (constructed by Sangallo), the Gregorian Tower, and the Michelangelo fort (work of Bramante and Michelangelo).

In the walls of the old Darsena, also, there are worthy of mention several lions' heads in bronze, of classic design, whose fangs hold the rings which previously served for the ropes of vessels. They were fixed in the year 1519, under Pope Leo X.

II. DESCRIPTION OF THE PORT.

QUAYS, WATER SPACES, DRAUGHTS, UTILISATION.

The port of Civitavecchia is in the form of an irregular polygon. It is protected by a long outer breakwater, commencing near the Michelangelo fort, and after running about 400 metres in a W.S.W. direction, turns to N.W. for another 900 metres, almost parallel with the coastline. The middle part of said breakwater, from the lighthouse to the Gregorian fort, which is a massive tower of solid internal construction, takes the name of the Trajan Breakwater (Antemurale Traiano), and consists almost entirely of the antique Roman construction; the portion from the lighthouse to the S.E. corner is called the southern extension of the Antemurale Traiano, and is protected externally by a parallel outer breakwater at a distance of 40 metres, and 250 metres long; the remaining portion of this up to the Michelangelo fort is called the Diga di interclusione (enclosing dam), and lastly, the remaining tract of the mole from the Gregorian Fort, or Marzocco, which forms the outer port, is called the Northern Extension of the Antemurale Traiano.

From the Michelangelo fort there branches out another mole, parallel to the Southern Extension of the Trajan Breakwater,

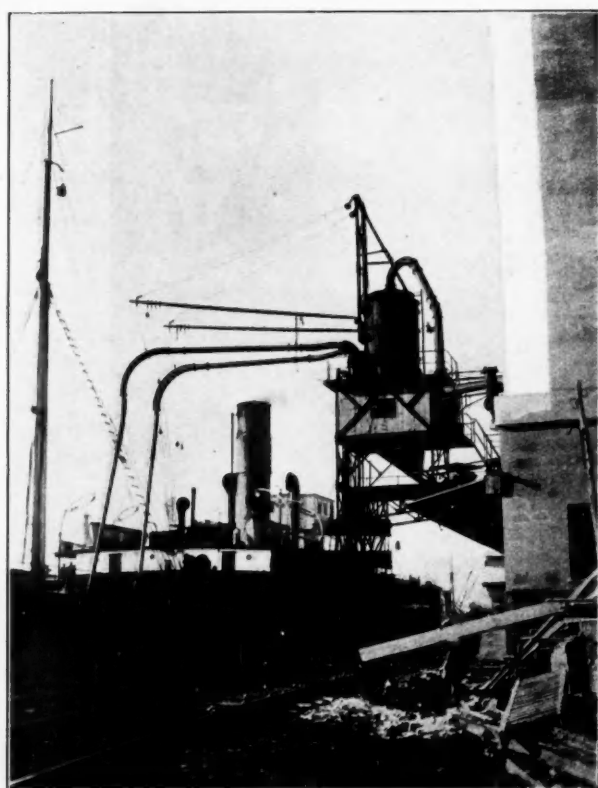
about 250 metres long, which was previously curvilinear, in the portion of which, towards the fort, the work of widening is being carried out; this is called the Mole of the Bicchiere from the fort which rises at the extremity.

In the main basin, near to the Harbour Master's office, there is a small jetty, about 85 metres long W.N.W. and 20 metres wide, used exclusively as a landing place for the Sardegna mail boats.

Lastly, the internal basin is protected and separated from the outer port by a mole which extends in the direction of the Trajan Breakwater, which takes the name of the Lazzaretto Mole, from the old buildings existing there, finishing at the end with a small circular fort.

The position of the mouth of the entrance to the port is N.W.; the width, not all utilisable, is about 150 metres; the depth about 26-ft.; the water surface of the port totals 219,178 sq. metres.

Prevailing winds: from the 2nd quadrant around Sirocco followed by S.W., which vessels moored at the outer breakwater feel immediately in summer afternoon and night breezes; change in the weather is generally foretold by winds of the 3rd quadrant.



Discharging from Grain Silos.

Tide averages about 30 centimetres.

Bottom: rocky and muddy.

Lighthouse: between the Southern Extension and the Trajan breakwater, in white flashes, visible at 25 miles.

Lights: Coloured lights according to international regulations are placed at the head of the outer breakwater, at the head of the Lazzaretto Mole and on the internal extremity of the Trajan breakwater.

As a result of work in the enclosed basins there are the following water surfaces and depths, all of which are generally utilisable in the following manner:

In the New Darsena, where the draught is about 24-ft. and the water surface about 35,510 sq. metres, is carried out the loading and discharging of goods coming by steamers, sailing vessels, and by land. Along the quay running between the lighthouse and the root of the Bicchiere Mole, no vessel is allowed to moor, therefore the loading and discharging of goods, mostly coal, is carried out by means of lighters, by mechanical appliances and by railway wagons, sidings for which exist on the quay.

On the opposite side, along the mole of the Bicchiere, are moored vessels with cargoes of salt, frozen meat, and cereals, and also deep sea fishing trawlers, for the discharging and forwarding of the goods.

In the stretch of water in front of the Trajan breakwater, viz., from the lighthouse to the Gregorian fort, where the draught is 24-ft. over a surface of water of 48,675 sq. metres, up to the axes of the two forts of the Mole of the Bicchiere and the Lazzaretto Mole, vessels are moored for the discharging of goods, mostly coal, which is done mostly by means of lighters (colloquially called "burchi," lighters without decks, and "aconi," lighters with decks), which are towed to the quay of the New Darsena and discharged by mechanical means on to railway wagons.

In the stretch of water of the Old Port, where the water surface is about 105,726 sq. metres, and especially in front of the quay Principe Tommaso, where the draught is about 18-ft., steamers, sailing vessels, and motor fishing trawlers are moored for discharging and loading of goods by means of lighters. Along the Sardegna jetty are moored the mail boats for Sardegna.

Other vessels of small tonnage are berthed in the space of water in front of the Bernini Arsenal, where the draught is about 14-ft., and at the adjoining quay in front of the Michelangelo Fort, with slightly bigger draught.

The internal part of the Bicchiere Mole is at present out of use owing to the work of widening same, and this work is now being carried out.

In the Old Darsena, where the draught is about 18-ft., and in a water surface of about 29,237 sq. metres are berthed the several lighters which serve daily for discharging vessels, and also the deep sea fishing trawlers belonging to the Società Industria Pesca e Sottoprodotti (I.P.E.S.)—(The Fishing and Bi-Products Industry Company), which has its stores and repair shops in Old Darsena.

At the S.E. are moored vessels of small tonnage, for the loading of cement and alum, and the discharging of wines and general goods.

The internal side of the Lazzaretto Mole is for mooring lighters and vessels of small draught taking refuge in the port.

Finally, at the Northern Extension of the Trajan Breakwater where the draught is 30-ft. are moored vessels whose draught is over 23½-ft., and which, after having been lightened, are shifted to the Trajan Breakwater, where discharging operations can be carried out with greater safety.

The following table gives an exact idea of the extension of the quays, and their efficiency:—

QUAYS.

| Name. | Length. Metres. | Water Surface. Sq. m. | Draught. Ft. | Freshwater Coals. |
|--|--------------------|-----------------------------|-----------------|----------------------|
| MOORING QUAYS | | | | |
| North Breakwater (1st and 2nd portions) | 360 | — | 30 | 4 |
| Trajan Breakwater | 200 | — | 23 | 4 |
| Porta Livorno | 90 | — | 18 | 3 |
| Vecchia Darsena—Sponda N.W. and S.W. | 250 | — | 17 | — |
| Lazzaretto | 260 | — | 12 | 1 |
| QUAYS FOR DISCHARGING AND LOADING OPERATIONS: | | | | |
| South Breakwater* | 170 | 3400 | 22 | 3 |
| Enclosing Dam* | 130 | 2600 | 18 | 4 |
| Junction Quay* | 55 | 1350 | 22 | — |
| Bicchiere Mole— | | | | |
| New Darsena side* | 240 | 7700 | 22 | — |
| Harbour Master's Office side* | 200 | 6400 | 17 | 2 |
| Fort Michelangelo Quay* | 100 | 4500 | 16 | — |
| Arsenal Bernini Quay* | 70 | 2100 | 14 | 2 |
| Sardegna Jetty | 100 | 3200 | 18 | 3 |
| Principe Tommaso Quay | 160 | 3200 | 18 | 3 |
| Old Darsena S.E. and N.E. sides | 200 | 1000 | 17 | 2 |

N.B.—The quays marked * are supplied with railway sidings.

III. MECHANICAL MEANS AND ESTABLISHMENTS FOR DISCHARGING.

The port is supplied with the following mechanical means for loading and discharging:

On shore: On the Enclosing Dam: two travelling steam cranes capable of 50 tons per hour each.

On the Trajan Breakwater: two steam cranes (grabs), one capable of 50 tons per hour and the other 40 tons; also three travelling cranes (pails) capable of 25 tons per hour each.

At the commencement of the Bicchiere Mole: one crane (buckets) capable of 25 tons per hour, and another of the same capacity on the Fort Michelangelo quay, where there is also another hand crane, property of the State, used for small cargoes, and capable of lifting a maximum of 5 tons.

The private means belong to the concessionaires: Società Co-operativo Lavoratori del Porto, Morando Antonio, Bellettieri Antonio, Carbo Raffaele.

In the precincts of the port there exist the following warehouses, sheds, trade and industrial establishments: On the Bicchiere Mole: Grain warehouse, built of ferro concrete, composed of 63 cells of a total capacity of about 16,000 cubic metres, corresponding to about 12,000 tons of grain, and a tower for the machinery. The machinery is composed of two elevators for vessels, both overhead travelling type on the front of the quay, one of suction and the other of the bucket type, each capable of 100 tons per hour. Each discharges the goods from the holds by means of longitudinal travelling belt, from which they pass on a transversal belt, thence to an internal elevator (pails), then the weighing is done (two automatic scales of 900 kilos capacity), thence the grain passes into another elevator (pails) and by means of a travelling belt reaches the cell for which it is destined.

All the machinery is driven by electric motors, of 45-50 periods, 500 volts. The reloading is effected by gravity, by means of four automatic scales of 100 kgs., capable of 4-5 sacks per minute. By means of special discharging pipes cereals can also be reloaded in bulk.

GRAIN WAREHOUSE AND COLD STORE.

This is a ferro-concrete building: the part towards the head of the mole is refrigerated by means of direct expansion of ammonia gas, by means of one of the two compressors situated in the cell, which, subsidised by a current of dried and cooled air, can cool the rooms as far as 12 degrees below zero. There are eight refrigerating cells with a capacity of about 1,000 tons of goods.

The general warehouse has five chambers holding about 1,200 tons of goods. The various floors are served by three hoists of 800 kg. capacity each, and by one travelling crane on the quay of 1000 kgs. capacity.

SALT SILOS.

This is a ferro-concrete building, of eight storerooms holding 600 tons of salt each, and four small cells of 50 tons each, for special salts. The discharging is done by means of an elevator for ships, the same as the bucket elevator of the grain silos, and capable of lifting 50 tons of salt per hour. The filling of the storerooms is done by travelling belts and internal elevator. The reloading is done by two bucket elevators fitted with semi-automatic weighing and bagging appliances, capable of 1,200 sacks in the ordinary working day. The weighing on entering is done by means of an automatic scale of 1000 kg. capacity.

The operations and quantities of these departments are given herewith:—

| | | Tons. | |
|----------------------------------|------|------------|---------------------------|
| Grain silos: | 1926 | Entered | 68,316.45 |
| | | Despatched | 65,199.16 |
| | 1927 | Entered | 65,501.32 |
| | | Despatched | 64,542.02 |
| | 1928 | Entered | 67,177.26 (1st half year) |
| | | Despatched | 64,809.79 " " |
| Salt silos: | 1926 | Entered | 20,546.21 |
| | | Despatched | 18,602.34 |
| | 1927 | Entered | 25,244.72 |
| | | Despatched | 24,084.09 |
| | 1928 | Entered | 13,254.70 (1st half year) |
| | | Despatched | 12,562.55 " " |
| Cold store and general warehouse | 1926 | Entered | 2,084.83 |
| | | Despatched | 1,633.40 |
| | 1927 | Entered | 2,888.62 |
| | | Despatched | 2,721.11 |
| | 1928 | Entered | 1,341.95 (1st half year) |
| | | Despatched | 1,799.67 " " |

In connection with these departments the following railway wagons were used:

Grain Warehouse, Salt and General Warehouses, and Cold Stores: In 1926—Total number loaded, 5,400; discharged 95. In 1927—Total number loaded, 5,747; discharged 140. In 1928 (first half-year)—Total number loaded, 4,875; discharged, 62.

And the following movements on the quay: In 1926—Steamers, 46; Motor-sailing vessels, fishing trawlers and sailing vessels, 6. In 1927—Steamers, 45; Motor-sailing vessels, fishing trawlers, and sailing vessels, 4. In 1928 (first half-year)—Steamers, 26; Motor-sailing vessels, fishing trawlers, and sailing vessels, 31.

In the figures for the first half of 1928 are also included operations effected in the Fishing Shed.

The grain warehouse, salt warehouse, general goods, and cold store, belong to the Società Anonima Sylos e Magazzini Generali, of Civitavecchia, with Head Office in Rome, with a capital of Lire 9,000,000.

FISH SHED.

This is of 300 sq. metres, and is used for the discharging, washing, preparing, and despatching by rail, fish caught on the Atlantic coasts of Morocco, by the fishing trawlers of the Società Industria Pesco e Sottoprodotti, with Head Office in Rome and Agency in Civitavecchia.

Large warehouses, sheds, and huts also exist in the square of the port station in the Bernini Arsenal, Sardinia jetty, in the Old Darsena and Lazzaretto of a capacity of 90,000 tons. They are used for different purposes—customs, grain depots, general goods warehouse, depositing and forwarding of fish cargoes of the coasting trawlers, depots for general goods, wines, comestibles, etc.

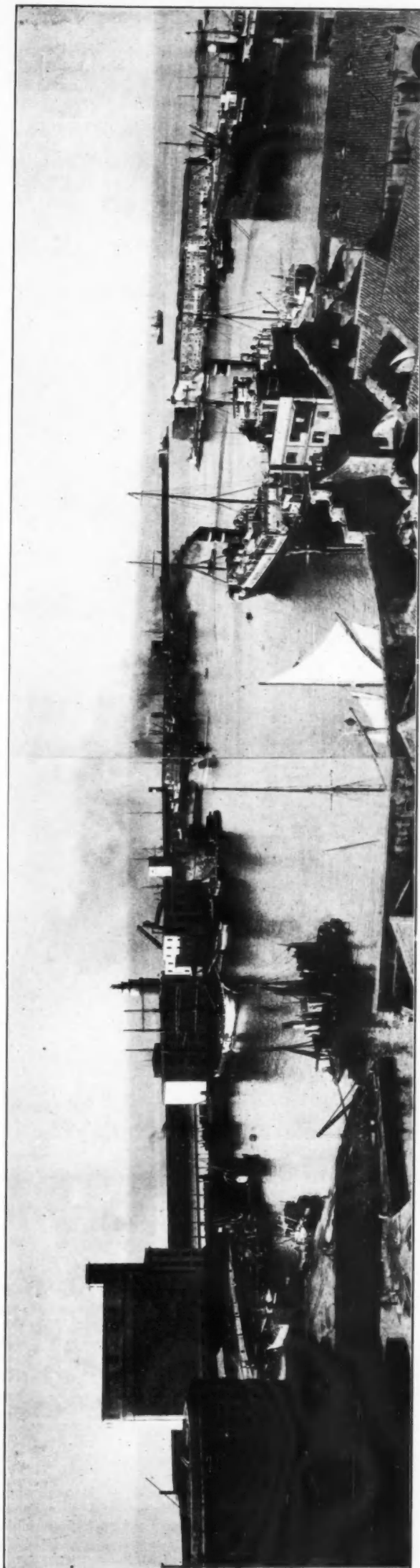
IV. REPAIR SHOPS FOR VESSELS.

The following repair shops exist for the repair and refitting of vessels:

Marani, Gustav and Son, Engineering shop, with iron and bronze foundry; Arci and Saladini, Engineering shop, with iron and bronze foundry; Matarese and Sportiello, Engineering shop with bronze foundry; La Concordia, Engineering shop.

Near the Bernini Arsenal there is the slipway and workshop of the shipbuilder, Emilio Picchiotti. The slipway is fitted with electric windlass with a 35 h.p. motor of 500 tons capacity, and can receive small steamers and craft of the maximum length of 40 metres, and maximum weight 250 tons.

There is another slipway for lighters in the Old Darsena, owned by Antonio Morando, with hand windlass, suitable for lighters of maximum tonnage of 200 tons.



Port of Civitavecchia.

Also in the Old Darsena will shortly be opened a floating dock for the Società Industria Pesca e Sottoprodotti, details of which are: of steel construction, length metres 70.90 by breadth metres 15.20 by height metres 6.65, with two regulating broadsides, of maximum tonnage 500, maximum length of vessel entering 80 metres, and maximum width 10 metres, emptied by means of electric pumps worked from on shore.

V. FLOATING CRAFT USED FOR PORT MOVEMENTS.

The floating craft generally used in the port are: for loading and discharging operations 109, of total tonnage 5378 tons; port movements (small boats) 150, total tonnage 489; sheerleg pontoons (capable of lifting 70 tons) 1, tonnage 224; grab lighters for bunkering 1, tonnage 98; tugs 7, total tonnage 39; for Maritime arts 12, total tonnage 97; for other services 180, total tonnage 430.

VI. OBSERVATIONS ON THE GOODS TRAFFIC.

Comparison of statistics of the principal Italian ports in recent years shows that the port of Civitavecchia has held the 7th or 8th position, coming after Genoa, Trieste, Venice, Naples, Leghorn, Savona, and Palermo, with the last-named of which Civitavecchia is almost equal.



Salt Silos.

Given the position of Civitavecchia, almost in the centre of the Italian peninsular and its extensive inland market, the port of Civitavecchia should undoubtedly have reached a better position in the scale had it not been that up to the present it has had to fight against great drawbacks which prevented its development.

These drawbacks are: limited water spaces disposable; limited draughts, limited quays, and, above all, bearing in mind that the traffic of the port is principally importation, the very limited supply of railway tracks, which are necessary for the forwarding of goods to destination. This last-named drawback has up to the present prevented a greater use of mechanical means for discharging, thereby lessening the efficiency which in the present conditions could not fail to cause the lamented congestion.

The internal zone served by Civitavecchia is very extensive: Rome, the entire district of the Lazio, and in great part the provinces of Grosseto, Siena, Arezzo, Perugia, Aquila, and Frosinone, and also Sardegna. The Civitavecchia-Orte Railway, recently opened up, will make the area served by Civitavecchia still wider.

It is due to the importance of its inland territory that Civitavecchia, in spite of the deplored deficiencies, has not lost its position, in fact, it has continued to increase, and has kept pace with the preceding ports, losing nothing even when the others experienced setbacks and crises.

The indefatigable energies of the working classes, who, thanks to the Regime, have become diligent and disciplined, has considerably helped in the continuance of such favourable returns.

With about 1700 metres of railway line, the port of Civitavecchia, up to the present, has not been able to forward more than 200 wagons to the station daily, representing about 3000 tons of goods daily, whereas the forwarding by water has been about 600/700 tons per day.

The average yearly traffic on the quay front has reached per each metre about 1200 tons and in some part even 2000 tons per metre.

Had there been signs of a greater forwarding efficiency, and if it had been possible to eliminate the deplorable deficiencies of the port, which prevent vessels coming alongside the quay, thereby forcing them to employ a great amount of hand labour, and very limited use of mechanical means, results would have been very different, as more tonnage would have come, and there would have been greater development and opening-up of local industries.

These deficiencies, as will be shown hereunder, are bound to disappear; this has been promised by the present Government, which appreciates the natural resources, and having promised, has immediately commenced operations.

We here give the shipping and trade movements of the port of Civitavecchia during the last five years:—

SHIPPING AND COMMERCIAL MOVEMENTS.

| YEAR. | STEAMERS. | | SAILING VESSELS. | | TOTALS. | |
|------------------------|-----------|-----------|------------------|-----------|-----------|-------------------|
| | Italian. | Foreign. | Italian. | Foreign. | Net Tonn. | Goods Discharged. |
| | Net Tonn. | Net Tonn. | Net Tonn. | Net Tonn. | | |
| ARRIVALS: | | | | | | |
| 1923 | 771399 | 178055 | 24152 | 2658 | 976264 | 535978 |
| 1924 | 798338 | 236667 | 31179 | 1169 | 1067353 | 635978 |
| 1925 | 904330 | 242041 | 42506 | 545 | 1089422 | 602942 |
| 1926 | 788578 | 201859 | 41996 | 989 | 1033492 | 690281 |
| 1927 | 862265 | 260839 | 32900 | 1266 | 1157269 | 818485 |
| 1928 (first half year) | — | — | — | — | 592213 | 454609 |
| SAILINGS: | | | | | | |
| 1923 | 774637 | 175161 | 26485 | 2422 | 978705 | 108231 |
| 1924 | 798704 | 228898 | 30928 | 1123 | 1059653 | 69475 |
| 1925 | 796586 | 227597 | 41230 | 393 | 1065806 | 70111 |
| 1926 | 762388 | 203730 | 44034 | 1060 | 1011212 | 75374 |
| 1927 | 800012 | 257772 | 31216 | 1156 | 1090150 | 120008 |
| 1928 (first half year) | — | — | — | — | 636143 | 56642 |

The chief import is coal, which amounts to about three-quarters of the total traffic, and which is destined inland for the Stabiliment Carbonifera Italian, for bunker, for the Terni Steel Works, State Railways, Rome Gas Works, etc. Then follow cereals, timber, marine salt in considerable quantities. There is a small quantity of general merchandise, consisting principally of wine, building stones, bricks, scrap iron, very small quantities of manure, mineral oils, and liquid fuels, which in the near future, with the coming of motor ships, must necessarily substitute the coal, and become one of the main sources of traffic for Civitavecchia.

The goods exported supply mostly the coasting trade; cement products from the local factory and from that of Santa Marinella; lime, chalk, flour, general goods, and alum from the local caves at Allumiere.

The traffic with Sardegna is also of considerable importance, thanks to the mail boat service, particularly in regard to the transport of passengers.

For the Compagnia Italiana Trans-atlantica Civitavecchia is, in fact the chief port for their

3rd Line—Civitavecchia—Terranova Pausania and back (daily)..

4th Line—Civitavecchia—Cagliari and back (weekly) and is a port of call for their

9th Line—Genoa—Leghorn—Civitavecchia—Cagliari—Tunis—and back (every week).

The statistics of passenger traffic during the last five years show—

| | Arrived. | Sailed. |
|-------|----------|---------|
| 1923 | 66,475 | 64,759 |
| 1924 | 67,571 | 69,475 |
| 1925 | 75,428 | 77,018 |
| 1926 | 49,841 | 48,430 |
| 1927 | 77,141 | 71,494 |
| *1928 | 28,476 | 33,857 |

(*1st half-year.)

The Fishing Industry, thanks to the provision of the Government, also provides an increase in the exportation and forwarding that is well worth taking into consideration.

A fleet of steam and motor trawlers used for coast fishing, is based at Civitavecchia and serves principally the Rome market with yearly quantities of about 40,000 quintals.

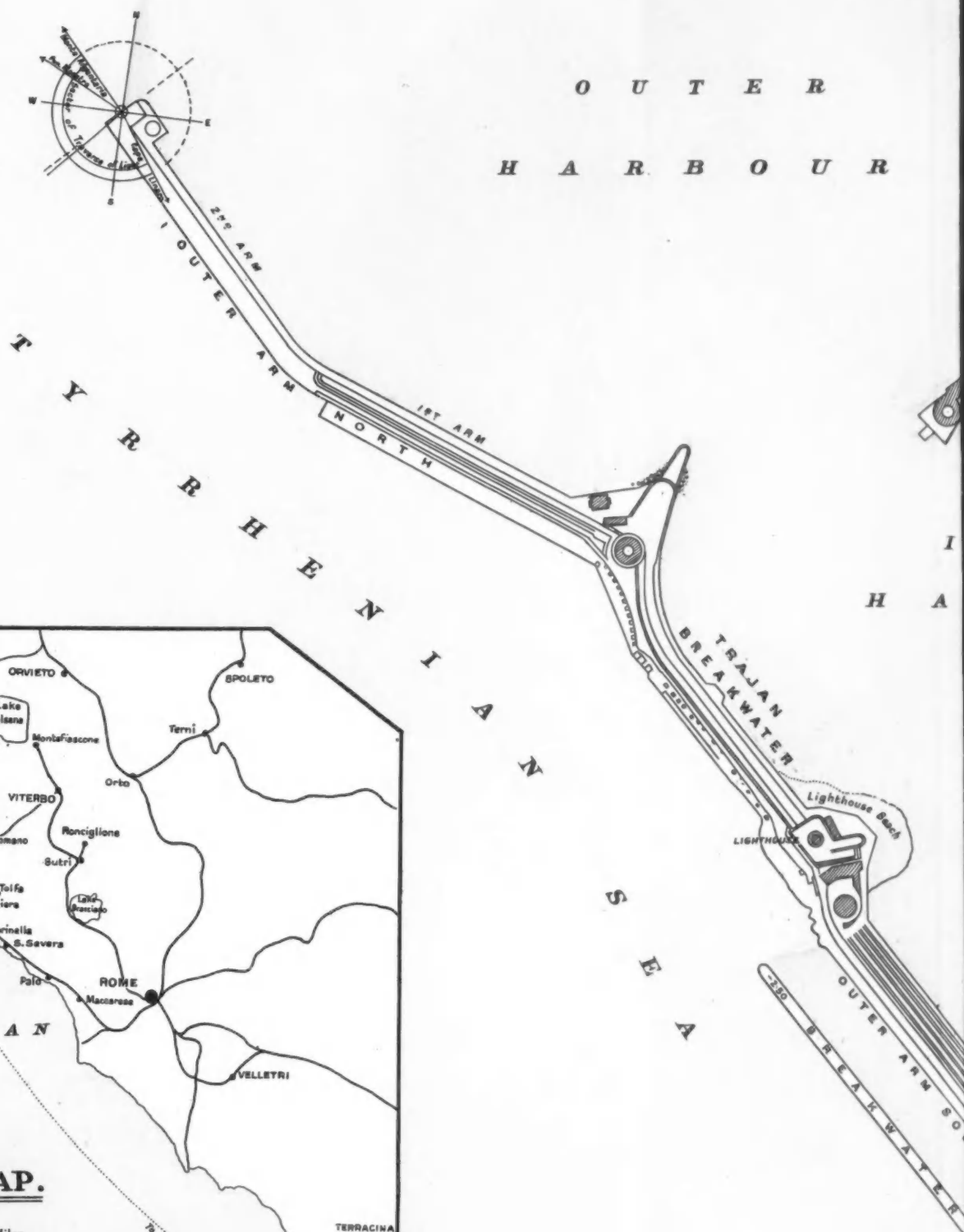
The National Government has also recently declared Civitavecchia First Fishing Port, allotting one part of the port exclusively for the Deep Sea Fisheries Industry. This was opened up in the latter months of 1927, in the Atlantic waters of Morocco and the Canary Islands, for which were used some steam trawlers belonging to the Società Industria e Sottoprodotti, of which the President is H.R.H. Prince of Udine. The Company has its equipment base at this port.

From June, 1927, when the first steam trawler was moored here, up to June, 1928, 980 tons of fish of first quality have been discharged here.

PORT OF CIVITA VECCHIA

CAPTAIN OF THE PORT;— LIEUT. COLONEL SILVIO LOMAZZI.

O U T E R
H A R B O U R



KEY MAP.

Scale of English Miles.

THE DOCK AND HARBOUR AUTHORITY, FERRARA

LA VECCHIA.

COLONEL SILVIO LOMAZZI.

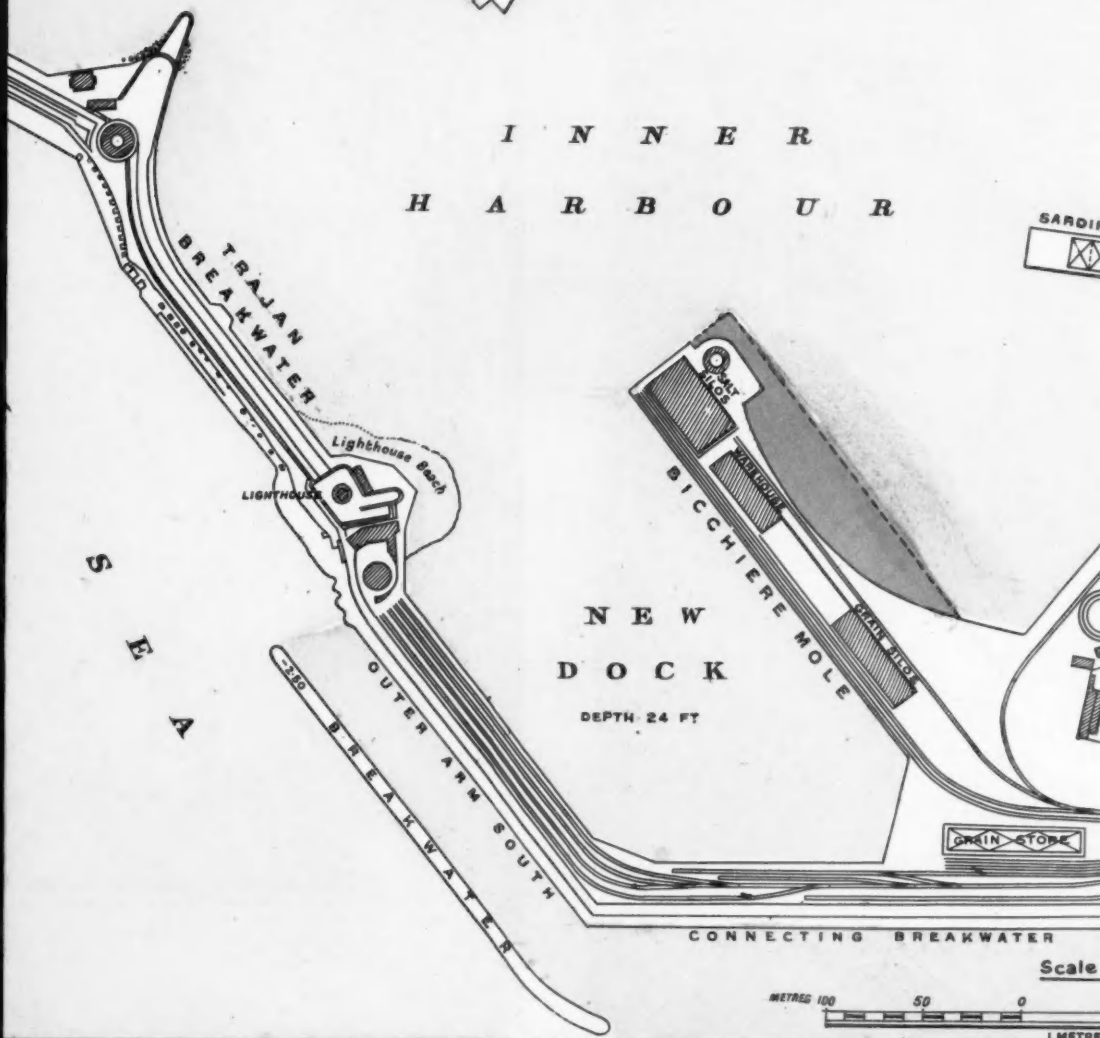
O U T E R

A R B O U R



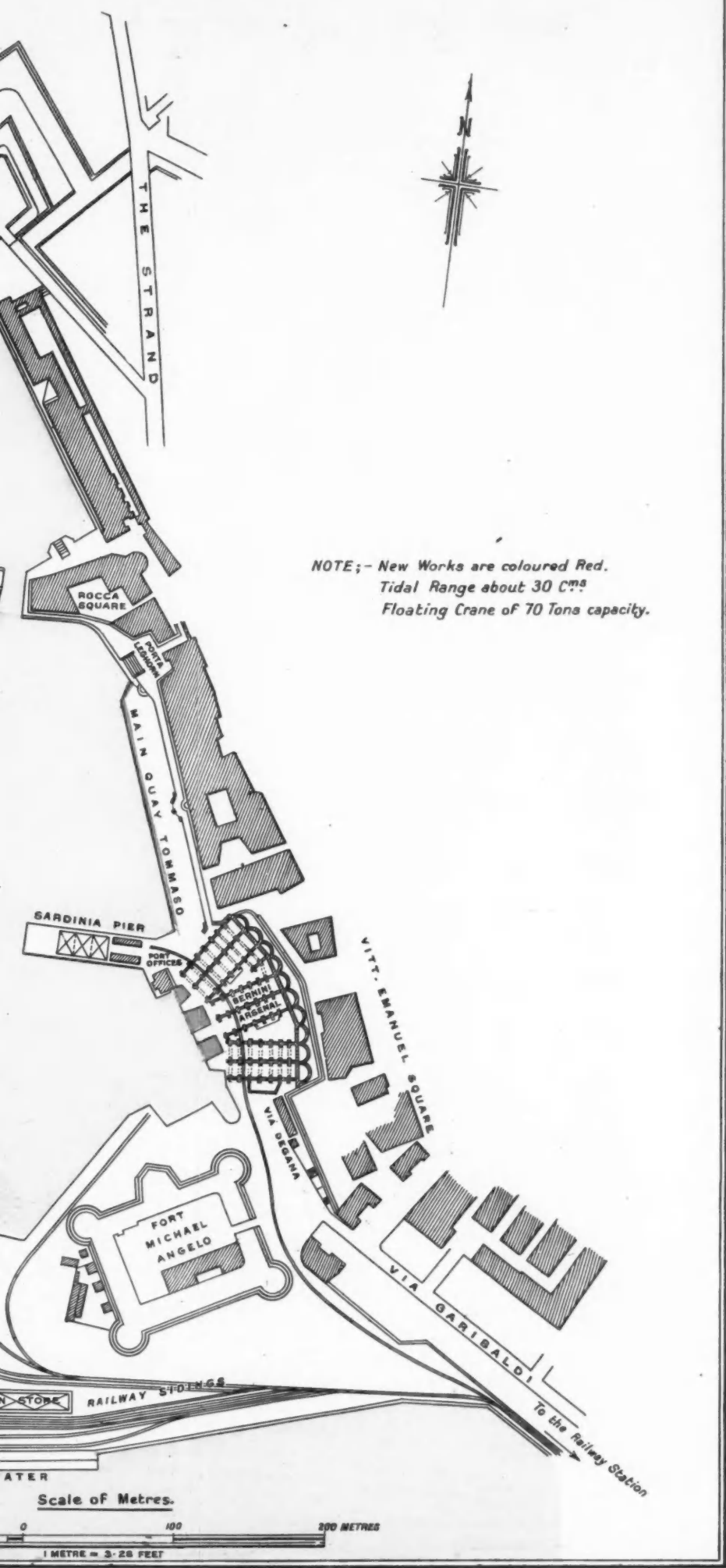
I N N E R

H A R B O U R



Scale
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FEBRUARY. 1929.





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VII.—SUPPLIES.

On the quays of the port there are several water cocks and fountains for the supply of vessels. Water is abundant and healthy and is supplied with special hoses belonging to the Municipality, which can supply up to two vessels at a time, at the price of Lire 2.70 per cubic metre, f.o.b. for merchant ships, and Lire 1.40 for war vessels.

There are several bunkering firms for supplying coal for bunkers, amongst whom are: Captain Corbo, A. Bellettieri & Co., and Antonio Morando fu Giovanni.

Captain Corbo, for supplies, in addition to a floating depot of about 3,000 tons of coal, owns a big lighter with steam crane, with which he can supply vessels at about 100 tons per hour while the vessel is carrying out her commercial operations.

Petrol and paraffin can be found on the market in limited quantities.

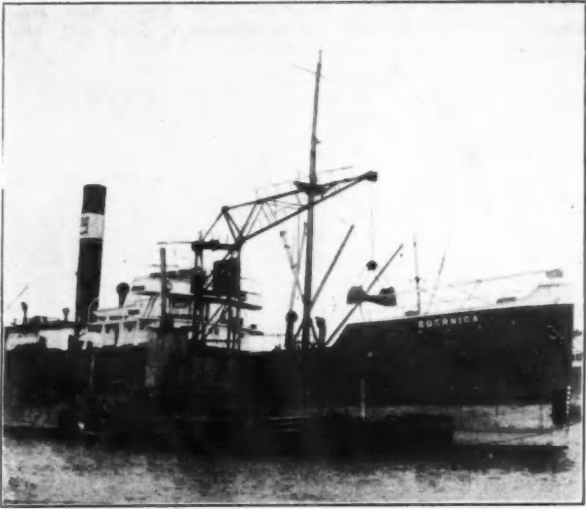
On the southern extension of the breakwater there is a tank for the supply of naphtha, of which the concessionary is the Società Anonima Italiana Importazione Oli, with head office in Rome and Agency at Civitavecchia. The capacity of the tank is 3,500 sq. metres for liquid fuels and heavy oils; usually containing about 1,200 tons; connection on Quay No. 3. Vessels up to 120 metres in length, with a draught of 6 metres at the bow, and 6½ metres at the stern can be supplied without difficulty.

VIII.—ASSISTANCE.

Ships' stores and supplies are rather scarce. Fresh provisions can be had in abundance.

There are three divers in the port, whose work can always be relied on. For towage there are a few tugs.

A co-operation of pilots has its look-out station on the Gregorian Fort, and their office is in the Bernini Arsenal. The shipping agencies arrange for the mooring.



Floating Steam Grab.

Civitavecchia possesses a harbour master's office, which is situated near the Sardegna Jetty. The Captain of the Port is Lieut.-Colonel Silvio Lomazzi.

There is also a Meteorological station in the office of the Captain of the Port.

There are also Consular offices on the spot for the following nationalities: England, France, Spain, Belgium, Monaco, Greece, Columbia, Portugal, Paesi Bassi, Sweden, Norway, Panama, Chile, Peru.

DISTRIBUTION OF PORT LABOUR—PORT SERVICES—EXISTING REGULATIONS AND TARIFFS IN THE PORT.

There is at Civitavecchia, as in the other principal ports in the Kingdom, a Port Labourers' Office, founded in accordance with Ministerial Decree, 20th January, 1926.

Said office is worked under the supervision of the Captain of the Port, is managed by an officer of the Harbour Office, supported by representatives of the classes interested and by a representative of the Inspector of Works, and its work is to hold the rolls of workers, to authorise the carrying-out of work and port services, the distribution of labour on board vessels, to settle arguments, to register and supervise the carrying out of operations and the maintenance of discipline, to fix the working hours, tariffs, etc.

Thanks to this splendid Fascist institution, the smooth running of port work, the good order, discipline, the moral and economical conditions of the working classes are assured; for some time past, both in the port of Civitavecchia and in other Italian ports, work is carried out punctually and uninterruptedly, to the satisfaction of the classes interested and the profound well-being of the country.

The permanent works at present inscribed in the Works Office are: Haulage, 298; Loading and Discharging, 213;

Lightermen, 59; Winchmen, 28; Weighers, 21; Silos, 32; General Goods, 18, making a total of 669.

A booklet dated May, 1928, published by the Works Office, is on sale, showing the working regulations and tariffs regarding the handling of goods.

To avoid making this report too long we give the rates for discharging the most important goods:—

| Class of Goods. | From Hold to Tackle. | From Tackle on to Wagon or Quay, including use of Lighters |
|-------------------------------|----------------------|--|
| Grain in bags: | | |
| Without weighing ... | 4.75 | 7.55 |
| Weighing included ... | 7.05 | 7.55 |
| Ordinary coal ... | 5.80 | 8.30 |
| Timber (planks and beams) ... | 8 | Hand labour 13.80 Cranes 10.80 |
| Frozen meat ... | 12 | 16.05 |
| Cement ... | 6.20 | 9.50 |
| General goods ... | 7.60 | Hand labour 13.85 Cranes 12.25 |

The work in the port is almost entirely carried out by the Port Workers' Co-operative, Limited (Soc. An. Co-operative Lavoratori del porto), which also directly controls all the means of work (cranes, lighters, tugs, etc.).

This Co-operative, founded in March, 1897, has completely abolished all intermediaries, fixing forfeits for the discharging of goods, including labour and discharging means, so that goods are taken from holds and put into railway wagons, or on to quay, or transported into the local works. This is of great advantage to trade, because it has provided a means of making known the precise costs of discharging the various goods, and of dealing with only one responsible party, the Co-operative.

This association, which numbers 568 members, all inscribed in the rolls of the Office of Works, has, in a short period, flourished considerably, and owns its Head Office, valued at about Lire 300,000, with four cranes with automatic grabs, valued at over Lire 600,000, and has founded several benefits in favour of its members, forming an Insurance section for the workers, against accidents at work; a Pension Fund for members who are too old to work; a Burial Fund for the families of deceased members; hospital assistance, legal assistance, other individual assistance in the form of insurance, a co-operative for the consumption of goods of first needs, places of amusement and meeting, etc., all the provisions that enabled the Co-operative to merit the silver medal at the International Exhibition at Genoa, in 1914, and which have ensured it a long and prosperous life.

Dumping Rights.—The tariff for the dumping of goods on the quay is as follows:—

For the first 13 days after 48 hours of lying free, Lire 0.10 per sq. metre of ground occupied per day. Lire 0.20 for the following 15 days.

Port Water Supply Tariff.—For merchant ships Lire 2.70 per cubic metre, and for Naval vessels Lire 1.40, including the use of hose.

Pilotage Tariff.—Cmi.25 per N.R.T., minimum Lire 50, and maximum Lire 625. For internal movements the tariff is half that of the entrance rates. Vessels which, owing to their draught, are obliged to moor in the outer port to discharge part of their cargoes, being then towed to the inner port, must for the second movement pay one-third of the pilotage fee. Pilotage is not compulsory.

TUG TARIFFS.

| | Lire. |
|---|-------|
| Up to 1,500 tons register (in or out) ... | 180 |
| Movement in port ... | 200 |
| From 1,500 tons to 2,000 tons (in or out) ... | 270 |
| Movement in port ... | 300 |
| From 2,000 to 3,000 tons (in or out) ... | 300 |
| Movement in port ... | 375 |
| Over 3,000 tons (in or out) ... | 450 |
| Movement in port ... | 562 |
| After sunset the above prices are subject to an increase of Lire 100. | |

For taking vessels alongside the Silos Quay, Lire 100 extra.

MOORING AND UNMOORING TARIFF.

| For free trade: mooring in any part of the inner port— | Lire. |
|--|-------|
| Inner port ... | 40 |
| Northern Breakwater ... | 50 |
| Unmooring in any part ... | 20 |
| Shifting in any part ... | 60 |
| For regular liners:— | |
| Mooring and Unmooring in any part ... | 40 |
| Shifting in any part (mooring and unmooring) ... | 35 |

The tariff is increased by Lire 20 for the operations after dark and before midnight, and Lire 10 after midnight and before daylight.

TARIFFS FOR EMBARKATION AND DISEMBARKATION OF PASSENGERS.

| | Lire. |
|--|-------|
| Per passenger without luggage (excepting from the Trajan antemurale or its extension) | 0.25 |
| Ditto from the Trajan antemurale (or its extension) | 0.50 |
| Ditto from vessels in the Roads | 1 |
| Ditto with luggage or parcels an increase of 25 cents. | |

TARIFF FOR USE OF THE STATE CRANE (maximum lifting capacity 5 tons):—

| | Per Ton. |
|---|----------|
| For small parcels of goods weighing more than 5 tons | 3 |
| For large parcels | 1 |

TARIFF FOR PORTERS ON THE SARDEGNA JETTY.

For transport from the jetty to the gate:—

| | Lire. |
|---|-------|
| Per piece of hand luggage up to Kg. 30 | 0.50 |
| From Kg. 30 to Kg. 60 | 2 |
| From Kg. 60 to Kg. 100 | 3 |
| Transport from the gate to the station:— | |
| Up to Kg. 30 | 1 |
| From Kg. 30 to Kg. 60 | 4 |
| From Kg. 60 to Kg. 100 | 5 |

(Price to be arranged for heavier weights.)



Discharging with Steam Grab.

X.—PROVISIONS AND WORK FOR THE FUTURE.

To eliminate the inconveniences which obstruct the efficiency of the port, and to cope with increased future traffic, especially that which must come, now that the new railway line is opened from Civitavecchia-Orte, which will greatly increase the hinterland of Civitavecchia, products arriving there from the entire Provinces of Rome, Viterbo, Terni, and Rieti, and a considerable part of those from Grosseto, Perugia, Siena, Arezzo, Aquila and Frosinone, considerable improvements are being thought out, and others are at present being carried out.

By Royal Decree the Loans and Deposits Office has been authorised to allot a Grant to the Commune of Civitavecchia, of 23 million lire for the work of improving the port, to be refunded in eleven years, partly from the balance of the Public Works, and partly by means of special port taxes.

Another seven million lire granted previously is at disposal for the same object. It is calculated that in seven years the most necessary and urgent improvements will be effected.

The work at present being carried out is: The widening of the Quay Calata Principe Tommaso with a berthing quay of 150 metres in length and the draught of which is to be increased to 23-ft., which work can be considered almost complete; the widening of the inner quay of the Molo del Bicchiere by the construction of a quay parallel to the outer quay, this forming a jetty of 65 metres long and the draught here is to be increased to 28-ft.; demolition of the extreme arches of the Arsenale Bernini, and fitting-in of the small jetties in front of same, over which will pass the railway lines, which are to be extended past the Sardegna landing stage and along the Calata Principe Tommaso; the blasting and dredging of the inner part of the port, to bring the depth about 22 and 27-ft.

With the above work the Port of Civitavecchia will in a short time have 660 metres of quay with a draught of 27-ft., 550 metres with a draught of 22-ft., totalling 1,210 metres on

the main quays, and also 1,800 metres of smaller quays, not supplied with railway lines, and simple mooring quays.

The covered area of the port will total 5,170,000 sq. metres; the uncovered areas 28,800,000 sq. metres.

In addition to this, other work of construction must be commenced at an early date, and further improvements are in project and consideration.

As regards the widening of the railway siding east of the Michelangelo Fort, the alteration of the Molo del Lazzaretto and construction of a railway siding in the outer port, the construction of a lower quay for the mooring of fishing trawlers along the East side of the Old Darsena, all of this will cost about 10 million Lire; the complete alteration of the Molo del Lazzaretto, the strengthening of the outer defences, the building of a new railway junction and siding for shunting for direct communication between the port and the new Orte-Civitavecchia railway, the replacement and increase of mechanical appliances with better ones, for instance overhead cranes and discharging quays worked by electricity, the port will be increased by another 280 metres of quays with a draught of 27-ft., and a further 160 metres of quays with a draught of 22-ft., and further port areas reaching 17,250 sq. metres; greater railway facilities with additional 920 metres of railway lines for discharging; also two independent lines which will give a very quick service for the forwarding of goods.

The Bernini Arsenal, which is particularly adapted, will serve as the Customs Unbonded Warehouse for goods which must arrive in quantities, as arrangements are being made whereby Civitavecchia will become a Free Port.

Neither are the extensive buildings in the Old Darsena being overlooked. Here there will be railway junctions, cold stores, workshops repairing dock and marine store, and the storing and forwarding of the products of the fishing industry.

With this work, in regard to the expense of which the principal parties interested in the movement of the port have given their support, in addition to the Government grant, present congestion will be abolished, the quick and regular discharging of vessels will be guaranteed, they will not be obliged to lie in dangerous berths, they will find good berths with easy manœuvring, and absolute safety.

The Management of the Railways is drawing up a plan for carrying out the widening and definite improvement of the station of Civitavecchia so as to regulate the port traffic, and separate it from the ordinary traffic, giving a quicker service for the loading and discharging of vessels at the quays, and for forwarding. With the greater discharging capacity there must result a greater and more adequate capacity for forwarding to destination, so that it is to be hoped that at a not very distant date, the present goods traffic, which runs to about a million tons, will be almost doubled.

Things which in other times, when there was economic friction, and unwilling application, seemed dreams of a crazy mind, will gradually but surely be realised.

The zeal of work has already produced its first fruits, and goes to prove the firm tenacious intention of the present Government, which leaves no stone unturned, and which with the Italian people's consent, knows how to get the best out of them to carry through to completion every project of value.

Civitavecchia will, therefore, very soon possess a port such as is worthy of its traffic, in the interests of the nation and in harmony with the title it holds—"The Port of Rome"—which title is not an exaggerated illustration or an empty dream, but an absolute reality, as facts and history go to prove. *Quod est in votis.*

SHIPPING TRAFFIC AT HAMBURG.

According to a report received by the Department of Overseas Trade from His Majesty's Consul-General at Hamburg the tonnage entered and cleared at the port during the twelve months ended December 31st, 1928, totalled approximately 43,000,000 tons, as against 39,000,000 tons in 1927 and nearly 29,000,000 tons in 1913. Comparing the figures for 1928 with those for 1913 the increase was 51 per cent. in the case of the total tonnage entered and 48 per cent. in the case of the total tonnage cleared. The tonnage entered and cleared with cargo in 1928 showed similarly a very large increase, 20,000,000 tons entering and 16,500,000 tons clearing with cargo, as against 18,000,000 and 15,000,000 tons respectively in 1927.

Compared with November there was a trifling decline both in the total tonnage entered and cleared, but the tonnage entered and cleared with cargo showed a slight increase.

British shipping in December consisted of 205 vessels (379,620 tons) entered and 200 vessels (368,535 tons) cleared compared with 202 vessels (400,248 tons) entered and 195 vessels (365,340 tons) cleared in November.

German tonnage in December amounted to 796,882 tons entered (808,651 tons in November) and 758,776 tons cleared (787,651 tons in November).

Personal enquiries regarding shipping and transport matters should be made at the City Office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

Notes from the North.

OLD LANDMARK TO DISAPPEAR.

A notable landmark at Fleetwood for over sixty years, has been removed by the dismantling of the massive old crane which occupied a prominent place on the quay side, opposite the berth usually occupied in the summer by the Isle of Man steamers. Made at Belfast in 1864 the crane stood for many years on the railway sidings in Dock Street opposite to the Steamer Hotel. When the new railway station was built and the quayside was extended to beyond the site of the old ferry slip, the crane was moved along Dock Street and in front of Queen's Terrace to a place at the foot of the slope leading to the Manx steamers' berth. There it has since remained. Of late years it has been rarely used. Its lifting capacity, when originally tested, was 50 tons.

TIME-SAVING DOCK.

It was stated at a recent meeting of the Mersey Docks and Harbour Board that at the new Gladstone Dock, which had been opened nearly 18 months, the tonnage entering and leaving had been over eleven millions, excluding tugs and boats. The chairman (Mr. R. D. Holt) said he did not think that the public had thoroughly appreciated the enormous advantage that has been conferred upon the shipping using the north-end system by the new entrance. It was only those who had studied the returns who could realise the very great amount of time which had been saved by ships, both large and small, over and over again throughout the last year.

DREDGING PWLLHELI HARBOUR.

To the Pwllheli Town Council, the surveyor reported that he had made enquiries as to the cost of dredging the harbour. In view of the heavy expense which would be involved in dredging operations and having regard to the fact that the revenue would not be justified to any appreciable extent, the General Purposes Committee recommended to defer the matter for the present.

Alderman Roberts urged the council to ask the Board of Trade to interest themselves in the matter and to give help towards the cost of dredging. It was the duty of the Council to report upon the condition of the harbour. The harbour had cost too much to be allowed to silt up. At present no vessel of any size could enter the harbour. He suggested the appointment of a small committee to consider the whole matter. Mr. Josiah Williams remarked that the Board of Trade, together with the Town Council, had contributed £40,000 towards the construction of the harbour. It was decided to convene a special meeting of the council to discuss the situation.

BORING UNDER THE MERSEY.

The Mersey Tunnel Joint Committee have received a further report from the engineers who state that the work of enlargement of the under-river section comprised in No. 2 Contract is proceeding at seven points and that 12.3 per cent. of the total of 280,000 cubic yards of excavation have been done. On the cast iron lining, there are now in place 600 top half rings, totalling 6,200 tons, out of a total of 52,600 tons. The number of men directly engaged on the contract is about 600. Contract No. 3 for the full size branches at Birkenhead has been awarded, and it is hoped to invite tenders shortly for Contract No. 4. This will comprise the construction of full-size tunnels on the Liverpool side.

PRESENTATION TO DOCKS BOARD INSPECTOR.

Members of the engineers department of the Mersey Docks and Harbour Board have made presentations to Mr. Herbert Best, late Birkenhead District Mechanical Inspector, and Mr. John Shepherd of the General Stores Staff, on their retirement on superannuation. The testimonials were handed over by Mr. Gibson Smith, assistant engineer, Mr. Best receiving an oak bookcase and Mr. Shepherd a broadcasting Marconiphone set.

GROYNES FOR LLANDUDNO BAY.

The Llandudno Council has decided to withdraw an application made to the Government for a grant in aid of a scheme of coast defence, but to make an application for an ordinary loan for the construction of groynes of a particular type on the West Shore. This decision was made on the report of Mr. E. J. McKaig on a proposal to raise the sea wall. The Ministry of Health had postponed sanction to a loan for that purpose, pending the report of an engineer. On the proposal to raise the sea wall, Mr. McKaig wrote: "From the tidal data collected, such expenditure does not appear to be justified. Taking all the factors into consideration it will be seen that if expenditure is directed towards recovering and accumulating the natural defence of shingle by the construction of groynes, it is clearly the wiser and more economic course." Acting on the advice in the report, the council decided to lay down additional "crib" groynes and a series of short groynes. Mr. Ward, the local engineer, will collaborate in designing another scheme for the bay when sufficient data has been collected.

DOCK BOARD PILOTAGE DUES.

Mersey Docks and Harbour Board has accepted a recommendation of the Pilotage Committee that the chairman

of the Pilotage Committee or another member of the Board on that committee, attend an enquiry to be held by the Pilotage Commissioner of the Board of Trade with regard to applications made to the Board of Trade for a revision of pilotage dues. Mr. H. B. G. Warren said he did not wish to raise any objection, but he hoped they would have some further information given to them with regard to the policy to be adopted by the Board in that matter.

L.M.S. IMPROVEMENTS AT FLEETWOOD.

A notable improvement which will greatly facilitate the repairing and fitting out of steam trawlers at Wyre Dock, has just been completed by the London Midland and Scottish Railway Company and was used for the first time at the beginning of January. It consists of a re-arrangement of the railway track, enabling a powerful crane to travel alongside the quay and take heavy lifts from vessels undergoing repair, thus expediting engineering work. The alteration is part of the £100,000 scheme which the directors of the L.M.S. Railway have authorised for the extension and improvement of the fish stages at Wyre Dock, a scheme which, when completed, will make Fleetwood's fish market one of the finest and best equipped in the country.

THE PORT OF MANCHESTER.

The last twelve months has been a period of active development in the undertaking of the Manchester Ship Canal Co., Ltd. Manchester is sharing in the increase in exports of machinery and has sent away some large consignments, including locomotives for South America, India, Egypt, and other markets abroad. The extension of newspaper enterprise in the provinces was reflected in a considerable increase in paper imports, and the increase in the quantity of motor spirit which came in approached 45 per cent. Manchester as an oil port is now second only to London as far as this country is concerned. The shipping services between Manchester and foreign and coastwise ports continue to grow. The recently established service between the River Plate and Manchester is proving very satisfactory. Throughout the period under review full cargoes were obtained. This service was originally a monthly one, but since March last, the sailings have been fortnightly and the present schedule provides for two boats a month for some time to come. The Pacific Coast Service operated by Furness, Withy, provides for fortnightly dispatches. The Reardon Smith Line entered the North American Pacific trade in September with monthly sailings to British ports, including Manchester. The Gulf Line Steamers are now open to book cargoes to Manchester at the same freight rates as to Liverpool if sufficient Manchester support be forthcoming. Important developments have been going on at the Ellesmere Port end of the canal and here the wharf accommodation has been extended, new transit sheds built and equipped, and the most up-to-date coal conveyor plant installed. The developments include also the remodelling of the grain discharging and conveyor plant serving the 20,000 ton warehouse. But the crowning part of the work on this section has been the deepening of the canal and the dredging of the berths to 30-ft. This additional depth extends from the entrance at Eastham to above Stanlow Oil Dock.

RECONSTRUCTION OF FLOATING ROADWAY.

Mersey Docks and Harbour Board has made a start on the reconstruction of the Woodside Ferry floating bridge. For some time past plans have been in preparation for the work of reconstructing this roadway which was closed for traffic as from midnight on January 23rd, when the Dock Board commenced operations. These are expected to last about five weeks. During this period a frequent service of goods and vehicle steamers is being maintained by the Wallasey and Birkenhead boats to and from Seacombe only, by day and night. The present tolls via Woodside apply to the Birkenhead steamers via Seacombe. The date of the re-opening of the roadway will be announced later.

NOTEWORTHY ANNIVERSARY.

To celebrate the thirty-fifth anniversary of the birthday of the Manchester Ship Canal Co., Ltd., the British Broadcasting Co. (Manchester Station) presented a special programme. The main item in the celebration was a concert held in the board room at Ship Canal House, and thence broadcast from 2ZY. Earlier in the day, Mr. K. R. Brady spoke on the "Birth of the Port," and Captain Bacon, Chairman of the Company, on its present and rosy future.

FACILITIES FOR HANDLING BULK TRAFFIC.

The Traffic Committee of the Mersey Docks and Harbour Board submitted a recommendation to the January meeting that the engineer be authorised to proceed with the work of providing accommodation for discharging and loading bulk cargoes direct from ship to railway wagons at the berth at the east end of the south side of the Carriers Dock, and to make certain alterations in the position of the railway lines proposed in the schemes already sanctioned by the Board, at a total estimated cost of £23,970. Mr. E. G. Brownbill explained that in August last the Board had before them a proposal from the

Works Committee that in order to provide accommodation for discharging and loading bulk cargoes direct from ship to railway wagons, a berth 350-ft. long be provided with the necessary railway lines, cranes, capstans, weighbridge, etc., at the east end of the south side of the Carriers dock. It had felt for some considerable time past that Liverpool had not been securing a fair share of rough bulk cargoes, which required to be handled direct from ship to railway wagon, and the provision of this berth would undoubtedly enable the Board to make fuller use of a quay which was already in existence. There would be facilities for landing cargo on to the quay for removal by cart as well as for removal by railway wagon. The cargoes which they hoped to cater for consisted of timber, ore, billets, wood pulp, iron and steel and other bulk commodities, and the Traffic Committee felt sure that the provision of such a berth would cause larger imports of these commodities into the port.

RIBBLE DOCK UNDERTAKING.

Preston dock traffic returns came under review at the Town Council meeting. Councillor Ellison, speaking upon the Ribble Committee's minutes, mentioned the reductions in traffic returns at the dock. Almost every port in the country was suffering, he said. The committee proposed to lease for 21 years, 3,400 square yards of land on the dock estate to the Anglo-Cuban Asphalt and Bitumen, Ltd. The revenue would be approximately £2,500 per annum based on a yearly import of £10,000 and it was expected that the tonnage would soon be brought to 20,000. He thought that would show the Corporation that every endeavour was being made by the Ribble Committee and its officials to increase the trade of the dock and to get new remunerative business.

I.O.M. PIER WIDENING.

Following upon the recent visit of Mr. W. H. Moorby, M.I.C.E., the expert appointed by the Admiralty to supervise the work of widening the base of the Victoria Pier, Douglas, I.O.M., and the first portion of the Douglas Promenade, an official report has been received by the I.O.M. authorities containing recommendations as to the methods of construction. The plant for the new works is expected to arrive at any time now.

REPAIRS TO ALFRED DOCK BRIDGE.

The bridge over Alfred Dock inner entrance, Birkenhead, is being reconstructed by the Mersey Docks and Harbour Board. This has necessitated temporary arrangements for regulating the road and rail traffic. From January 19th to January 29th inclusive, the West roadway was closed and all traffic was worked over the East roadway of the temporary bridge. From January 30th until February 16th inclusive, the East roadway has been closed and all traffic worked over the West roadway of the new swing bridge. Traffic has been diverted as much as possible over the Duke Street Bridge and the Poulton Bridge. Whilst the reconstruction of the Alfred Bridge is in progress, no toll will be levied on vehicles passing over the Poulton Bridge.

WOODSIDE FERRY IMPROVEMENTS.

The modernising of the Woodside Ferry approach—urgently needed improvement—has been receiving the serious attention of the Birkenhead Council Committees. A scheme has now been prepared which is computed to cost about £4,796 for (1) the removal of the existing island footway on the north-westerly side of the Ferry approach; (2) the paving between this existing footway and the quay wall; (3) the construction of a new 19-ft. flagged footway on the north-westerly side of the Ferry approach; (4) the re-surfacing and drainage of the whole side (after removal of the bank building near the entrance to the floating roadway). The Ferries Committee has since approved of the proposals relating to the handing over of the yard alongside the floating roadway and the setting back of the hoarding to the quay wall, but has decided to request further consideration of the proposal for the handing over of the bank buildings for removal.

BIRKENHEAD CRANE CRASH.

As the result of an overhead crane falling at a shed at No. 11, Vittoria Dock, Birkenhead, one man was killed and two injured. The theory was that the pin connecting the jib of the crane and the cabin snapped. The driver of the crane had the presence of mind to shout as soon as he realised what had happened, and the men working beneath scattered. One man, however, seemed to hesitate, and the jib crashed on top of him, killing him instantly. The other men were caught as they tried to escape. After the crane had fallen, over 50 men were required to lift it in order to release the victims. It is understood that the crane was about due to be dismantled for overhaul. The carrier or girders on which the crane moved was intact, and apparently the movable part, which weighed about two tons, had fallen sideways. Just before the accident it carried a weight of about two tons, which was regarded as a fairly light load. Edward Arthur Nickels, foreman engineer for Messrs. Alfred Holt and Co., stated at the inquest that he was responsible for the maintenance of the cranes from 1919 to 1927. The crane was put into operation in April, 1915,

and had been in fairly constant use. During the period 1919-1927 it was completely overhauled every six months and in 1923 was taken down for rebushing. It had since been regularly overhauled, the last time on September 24th. Parts of the broken swivelling post of the crane were shown to the jury, and witness expressed the view that their had been a flaw in the metal. Robert Braithwaite, consulting engineer, of Brunswick Street, Liverpool, said that he found the supporting arm (or swivelling post) which was made of cast steel, cored through, had broken about 2-ft. 6-ins. from its lower end. At the point of the fracture there were two plugs, which had evidently been used as chaplets to support the core in the casting of the metal, and one chaplet had not fused with the rest of the metal. Witness expressed the view that there had been an internal flaw which had developed in the course of time.

Launch of Two Submarines.

A most interesting ceremony took place at the Naval Construction Works of Vickers-Armstrong, Limited, at Barrow-in-Furness on January 15th, when two of the three submarines being constructed for the Chilean Government were launched on the same tide. This is the first occasion for twenty years that two submarines have been launched one immediately following the other, and although in the early days of submarines, there were several double launches at Barrow, it must be remembered that the "Capitan Thompson" and "Almirante Simpson" are more than five times the displacement of the vessels launched twenty years ago, and the double ceremony can therefore be looked upon as being unique.

As in the case of the Chilean Submarine "Capitan O'Brien," which was launched last October, both the vessels bear British names. The "Capitan Thompson" was launched by Madame Arroyo, the wife of the Commanding Officer of the "Capitan O'Brien," and the "Almirante Simpson" by Mlle. Huneeus, the daughter of His Excellency Don Antonio Huneeus, the Chilean Minister to the Court of St. James's.

The vessels are of the British "O" Class type, similar to those constructed by the same firm for the Australian and British Governments. Eight submarines of this type have now been launched from the Barrow Works, bringing the total number of submarines launched to date up to 152, which is undoubtedly a record to be proud of.

The ceremony of blessing the vessels was performed by the Reverend Father E. Clark, of Ashton, Preston, formerly Roman Catholic Priest at Barrow-in-Furness, who was assisted by the Reverend Father T. Calderbank and the Reverend Father Gore.

The launches took place in the presence of His Excellency Don Antonio Huneeus (the Chilean Minister), His Excellency Admiral E. Costa Pelle (Chief of the Chilean Naval Commission in London), and a numerous and distinguished company of Officers of the Chilean and British Navies, officials of the Chilean Legation in London, and the higher officials of the Barrow Works. Lunch was served in the General Offices immediately after the ships had taken the water, presided over by Commander Sir A. Trevor Dawson, Bt., Royal Navy, at which Sir Trevor, on behalf of the Chairman and Directors of the Company, presented Madame Arroyo and Mlle. Huneeus with souvenirs of the ceremony, which he hoped would help to remind them of the occasion for many years to come.

In the speeches following the lunch, further evidence was given of the cordial friendship that exists between the two nations, a friendship that has steadily grown during the last 100 years and shows signs of becoming more intimate with the passing of time to their mutual benefit. Chile has sent her best naval officers to spend a year or two in this country. They are very welcome guests, and it is hoped that when they return to their own country, they will do so with the same happy recollections that they have inspired in all with whom they have come in contact in England.

TWOPENCE-A-WORD WIRELESS.

Marconi's Wireless Telegraph Company announce that the new light letter service at the reduced rate of twopence a word between Great Britain and New York, with corresponding reductions to other places in the United States of America and Mexico, is naturally also available by wireless "via Marconi."

The new service has been inaugurated to meet the demand for a special rate for lengthy messages across the Atlantic, and a fifty-word charge will be the minimum. The statement that "the usual rate for wireless is 3d. a word" refers to the ordinary night letter telegram service "via Marconi," which has a minimum of only 20 words.

The new service commenced at midnight on Sunday, January 13th. Under the present arrangements night letter telegrams for transmission by wireless at the new rate will have to be handed in at the Marconi Company's own offices in London, Liverpool, Manchester and Bradford, but the facility will shortly be extended so that twopence-a-word Marconigrams may be handed in at any postal or railway telegraph office.

Petrol Trucks for Dock Work.

Although considerable progress has been made in recent years in the widespread adoption of electric trucks for handling cargo at the docks and quays, the scope for development is obviously restricted by the availability of a supply of current and charging plant. The remarkable thing is that more pioneering work has not been attempted with petrol trucks, especially in view of the phenomenal growth of commercial motor transport during the last few years and the proved efficiency of the internal combustion engine which has stood up to the test of the most rigorous operating conditions. Many of the shipping and railway companies at home and abroad are, however, finding that the auto-truck is capable of giving a range of service for sustained periods. This clearly emphasises its great sphere of usefulness for short hauls. We instance the following concerns all of which are users of the Lister auto-truck:—Port of Bristol Authority, Avonmouth; Orient Steam Navigation Co., London; Peninsular and Oriental Steam Navigation Co., Shanghai; Milford Docks, Co., Milford Haven; Iceland Steamship Co., Reykjavik; Wilh. Wilhelmsen Shipping Line, Oslo, Norway; Compañía Antioqueña de Transportes; Barranquilla, Rep. Colombia; Jamaica Fruit and Shipping Co., Kingston, Jamaica; Royal Mail Steam Packet Co., Kingston, Jamaica; Beira Boating Co., Portuguese East Africa; all the English railway groups; The Great Northern Railway of Ireland; International Railway, Central America, San Salvador; Buenos Aires Western Railway Co.; Cordoba Central Railway; Central Uruguay Railway Co., of Montevideo, Ltd.; South African Railways and Harbours; Royal State Railways of Siam.

Electric trucking has established beyond dispute that the man-handling of goods at the ship's side is costly and wasteful, not due to any fault of the men themselves, but to the inherent defects of an obviously out-of-date system. But the electric truck is hampered by such conditions as high initial cost, its delicate mechanism, the need for re-charging batteries at least once a day, and its sluggishness when the batteries run down. This means that unless the battery and equipment are carefully looked after, the service potentialities of the truck cannot exceed more than a few hours per day. The Lister auto-truck does not suffer that handicap and with its ability to maintain an even rate of speed for 24 hours on end if necessary, its value is becoming increasingly recognised. This type of truck requires no more attention than the ordinary petrol motor. It does not require periodical docking for the recharging of batteries, neither does its range of usefulness decrease near the end of the day, as is the case with vehicles that derive their power from storage batteries. The auto-truck can maintain an even power output at speeds varying from 4 to 8 miles per hour, fully loaded, and at these speeds it costs less than $\frac{3}{4}$ d. per mile for fuel and oil.

The Milford Docks Co. has six of these trucks in use, and we learn that during the month of March they carried some 3,000 tons of goods in 878 trucks hours with a consumption of 96 gallons of petrol and three gallons of oil. The total cost including labour for loading and unloading the trucks worked out at about $7\frac{1}{2}$ d. per ton. The loads at Milford Docks consist sometimes of fish and at other times of sacks of grain, and are handled by crane at the ship's side and unloaded by hand. There are ten trucks in all at Milford Docks.

One of the greatest points in favour of the Lister auto-truck is its high performance. Although weighing only $8\frac{1}{2}$ cwt., and having an engine power of only $4\frac{1}{2}$ h.p., it can carry a load of one ton up a gradient of one in 14. On the level an extra two tons can be comfortably hauled by means of trailers. Maximum loads, of course, must depend, to a large extent, on the type of truck used. For dock work, where the roads are bad, good ground clearance and large rear wheels are necessary in order to cope with rougher conditions. Where quick runabout work is required and space is limited, the auto-truck is seen at its best, for it has the outstanding advantage that it can turn in its own length, or with its turnable steering device, the engine can be swung round to propel from the rear without the truck being turned at all. The load platform on general utility model is only 14 inches from the ground. Running on ball bearings it can be handled with the greatest facility by one man even when fully loaded and there are efficient brakes on all wheels, also a safety cut-out switch on the driving bar, to ensure complete control under any circumstances that might arise.

To obviate loss of time in refilling petrol tanks, these may be detached by unscrewing two wing nuts and substituting full ones. There is one model of auto-truck which is particularly suited for dock work. This unit is the "R" type, and was produced in response to the demand for a truck capable of negotiating rough roads. Apart from the larger rear wheels of 17 $\frac{1}{2}$ -in. diameter, springing is by two laminated springs to either wheel. These act as shock absorbers whilst giving perfect suspension. The advantages of transport by means of stillages deserves notice, because by this method of operation, when the truck is working with spare units, the most economic costings are achieved. Whilst the truck is moving one loaded

stillage, others are being loaded or cleared. The stillages have flared mouths to give easy access for the rear of the truck. What renders the auto-truck particularly suitable for dock work is its unique steering arrangement, enabling the power and steering unit complete, to be swung round in a semi-circle. Thus the vehicle can be manoeuvred in and out of the most awkward and congested places. This is an important consideration in quayside transport, for as is well known, when a steamer is being unloaded and work is proceeding at four or five holds, it is rarely possible to clear inward goods from the dock sheds at the pace they are being delivered from the ships. Furthermore, weighing and marking operations account for delay, as it is necessary to stow consignments in places convenient to the consignee.

The auto-truck has many of the advantages but none of the disadvantages of the electric vehicle, and as it can be kept at work for long stretches, it can be made to yield its full quota of service. The electric truck, on the other hand, has to lie idle for a certain time each day for charging purposes, the only alternative to which is keeping a spare battery on hand. A close analysis of costings, capital, and maintenance, shows very clearly that there is big scope for the application of the petrol-driven truck to the service of the dock and harbour authority.

Operating costs, of course, vary according to the number of hours per day that the trucks are being used and the conditions under which they run, that is to say, length and number of journeys, class of surfaces and the gradients (if any) which have to be negotiated. Taking the purchase price of the Standard fixed Lister platform truck on 10-in. wheels, £95, and allowing for depreciation over five years at 20 per cent., average interest on capital expenditure £2 17s., and repairs and renewals at 10 per cent. of the purchase price, this gives the fixed charges at £31 7s. per annum, or 88d. per hour for 50 weeks each of 168 working hours. Petrol and oil work out at about 2.1d. per hour, thus making the total cost per hour 2.98d. on the basis given. Assuming that the hours of operation are only 72 per week, the costs would work out thus:—

| | | | |
|------------------|-----|-----|-------------------|
| Standing Charges | ... | ... | 12s. 6d. per week |
| Fuel and Oil | ... | ... | 12s. 7d. per week |
| | | | £1 5 1 |

=4.2d. per hour.

Of course to these costs should be added a quota for repairs, maintenance, insurance, etc.

Expression in ton miles and taking the average speed of the auto-truck at 5-ton miles per hour for 50 weeks, each of 168 hours, the total cost per ton mile works out at .59d.

Port Dues in Yugoslavia.

Prevailing Rates of Exchange.

The Department of Overseas Trade has received from the Commercial Secretary at Belgrade the following list of official rates of exchange for the payment of port dues in Yugoslavia during the month of January, 1929, which have appeared in the "Official Gazette" of the 29th December, 1928:—

| | Dinars. |
|----------------------|---------|
| 1 Gold Napoleon | 218.60 |
| 1 Pound Sterling | 276.00 |
| 1 American Dollar | 56.80 |
| 1 Canadian Dollar | 56.50 |
| 1 German Mark, Gold | 18.55 |
| 1 Belga | 7.90 |
| 100 French Francs | 222.40 |
| 100 Italian Lire | 298.00 |
| 100 Dutch Florins | 2285.00 |
| 100 Rumanian Leis | 34.20 |
| 100 Belgian Levas | 41.00 |
| 100 Danish Crowns | 1519.00 |
| 100 Swedish Crowns | 1523.00 |
| 100 Norwegian Crowns | 1518.60 |
| 100 Spanish Pesetas | 926.00 |
| 100 Greek Drachmas | 73.50 |

Personal enquiries regarding shipping and transport matters should be made at the City Office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

NORWEGIAN SHIPPING LINE EXPANDS VANCOUVER SERVICE.

The Vancouver manager of the Canadian-American Shipping Company announces the establishment of a regular bi-monthly sailing from Vancouver to London, Hull, Oslo, Bergen and Antwerp. Two fine new 14-knot motor ships of the freight-passenger-refrigerator type are to be added to Fred Olsen's Norway-Pacific Line of five ships now serving the port. One of the ships is to be in commission in June, 1929, and the second is to be launched in December. Both vessels will have refrigerator space sufficient to carry 30,000 cases of apples.

Irish Harbour Matters.

MR. R. D. ROBERTS A MEMBER OF DUBLIN PORT AND DOCKS BOARD.

Mr. R. D. Roberts, recently appointed as Irish traffic manager for the London, Midland and Scottish Railway Co., has been co-opted a member of the Dublin Port and Docks Board in the room of Mr. F. McDowell, who resigned in consequence of being moved by the London, Midland and Scottish Railway authorities to England.

GALWAY AS TRANSATLANTIC PORT.

It is announced by the Hamburg-Amerika Line that, during 1926, their steamers will make at least five calls at the Port of Galway. In June and July the "Cleveland" will carry from New York and Boston, parties of Americans who originally belonged to the West of Ireland, while, on the western voyage "Tharingia," "Westphalia" and "Cleveland" will call at Galway in April, May and August.

DUBLIN PORT AND DOCKS MEMBERS.

There being no opposition, the following elective members of the Dublin Port and Docks Board have been re-elected:—

Traders Members—Messrs. Wm. Crowe, Chas. E. McGloughlin, James Moran, Chas. M. O'Kelly.

Shipping Members—Messrs. Walter Baird, Wm. Hewat, Jas. B. Hollwey, R. D. Roberts.

LIFFEY TUNNEL COMPLETED.

The work of constructing a tunnel under the River Liffey begun in 1926 has now been completed, and the contractors, Sir Robert McAlpine and Son (Ireland), Ltd., and of Pall Mall, London, have handed it over to the Corporation of Dublin. Work was started simultaneously at both sides of the river, one being near the Harbour Master's Office, North Wall, and the other at Thorncastle Street, Ringsend. The tunnel is 820-ft. in length and the North Wall shaft is 112-ft. in depth, the South end shaft being 107-ft. Both the tunnel and shafts leading to it are circular. The internal diameter of the tunnel is 7-ft. and the shafts are 11-ft. in diameter. The tunnel had to be driven entirely through rock, and much of the work of excavation was done with the aid of compressed air. The tunnel and shafts are lined with concrete. Already a 24-in. water pipe and a 15-in. sewerage pipe have been laid, the latter in connection with the drainage of the North Lotts area. The tunnel will also carry the requisite number of electric cables to supply light to Clontarf, Glasnevin and Drumcondra, where the population has increased enormously during the past four years.

LIMERICK HARBOUR BOARD.

Limerick Harbour Board is enjoying a period of prosperity. When it was recently decided to invest a further sum of £2,000 in National Loan, it was stated by Mr. Power, the secretary, that the Board had now £43,000 invested and if the existing state of things continued, a sum of £9,000 more could be invested at the end of the year.

The tender of Messrs. John Henderson, Aberdeen, for a new 5-ton crane at £292 was accepted.

LONDONDERRY PORT IMPROVING.

The revenue of Londonderry Port in 1928 amounted to £41,000, which is £1,500 higher than 1927, and the highest on record except for the years 1924 when it reached £41,821 and 1922 when it stood at £41,412.

The registered tonnage trading to the port was 1,119,475, which was only once exceeded and was 40,000 tons better than 1927. The increase was in the home trade which increased from 277,383 tons to 318,514. There was a 10,000 tons decrease in foreign trade and 4,000 tons decrease in Transatlantic steamers.

NEW SECRETARY AND GENERAL MANAGER FOR CORK HARBOUR.

Cork Harbour Board has promoted Mr. Eugene Gayer, assistant secretary, to the position of secretary and general manager, rendered vacant by the death of Sir James Long, at a salary of £600, rising by yearly increments of £50 to £800. Mr. Gayer has been in the employment of the Board for 15 years.

NEW TOBACCO WAREHOUSE FOR DUBLIN.

Dublin Port and Docks Board has accepted the tender of Messrs. W. and A. Roberts, Dublin, for the construction of a tobacco warehouse at Custom House Dock at a cost of £19,397. Ten tenders were received. The total cost of this new warehouse with the necessary equipment will be about £23,000.

TONNAGE AT DUBLIN INCREASED. NEW WORKS IN PROGRESS.

An interesting statement referring to work involving special expenditure outside the ordinary expenditure associated with the maintenance of the port was made by Mr. P. J. Lawrence when re-elected chairman of the Dublin Port and Docks Board for 1929 on the 10th January last.

The port has not only been kept up to its high standard of efficiency, but works have been put in hand during the year with a view to providing additional facilities. These under-

takings involve an outlay amounting roughly to £125,000. The following works have been undertaken:—

1.—The extension of the Alexandra Wharf by a further 850-ft. at an estimated cost of £85,000. This work is in progress and when completed will afford 1,500-ft. of the deepest and best equipped quay in any port in Ireland.

2.—The reconstruction of the fitting out wharf for the Dublin Dockyard Co., and the extension of this wharf so as to give the Dublin Dockyard Co. ample space for carrying on their undertaking.

3.—The erection of an additional tobacco warehouse in the Custom House Docks to meet the requirements of the tobacco trade.

4.—The electrifying of the Custom House Docks warehouses.

5.—The erection of a new electric crane on Sir John Rogerson's Quay.

The trade of the port has been well maintained and signs are evident of an improvement, which, even if slight, is very gratifying. Last year reference was made to the reduction in dues from 112½ per cent. of the schedule to 100 per cent. of the schedule, but notwithstanding this, the Board are able to show a fairly substantial surplus.

During the year, short term Mortgage Bonds amounting to £215,119 were converted into the Board's 5 per cent. stock, reducing the amount of Short Term Bonds outstanding to £98,125 at the end of 1928.

Needless to say the finances of the Board are in thoroughly sound condition.

Mr. E. H. Bailey, secretary, submitted a statement which showed the register tonnage which entered the Port of Dublin and upon which dues were collected during the year ending 31st December, 1928, to be as follows:—

Cross-Channel—1,720,092 tons, increase 5,364 tons; foreign 578,837 tons, increase 21,709 tons, making a total of 2,298,929 tons, showing an increase of 27,073 tons.

Mr. Chas. McGloughlin has been re-elected chairman for 1929.

IMPROVEMENTS AT THE PORT OF CORK.

Improvements at the Port of Cork to be carried out during the present season include the removal of the Turbot Sound bank at the entrance to the harbour. This would mean a perfectly straight channel from Daunts Rock, some four miles outside, to the entrance ground for Transatlantic liners calling at Queenstown (Cobh). At present these vessels are forced to cross over from the western to the eastern channel before tenders can come alongside in certain weather. Three months dredging, it is estimated, will be sufficient to remove this obstruction, and one further month's work annually would only be necessary to keep the channel at the requisite depth, even for the largest vessels afloat at all stages of the tide.

Work on the Victoria Wharf is now well in hand, but will not be completed before the end of the present year. The Cork Harbour Commissioners will also carry out certain alterations at the Admiralty Pier, Queenstown. The construction of a roadway is yet another feature of the Board's programme. The Tivoli reclamation scheme will be continued by the Cork Corporation.

STEAMERS WANTED BY CHILEAN GOVERNMENT.

The Commercial Secretary at Santiago, Chile (Mr. E. Murray Harvey, O.B.E., M.C.), reports that the Chilean Government are in the market for the purchase of steamers for the transport of coal.

United Kingdom firms desirous of offering British-built vessels can obtain further particulars upon application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. Reference number A.X. 7361 should be quoted.

KIEL CANAL TRAFFIC IN NOVEMBER, 1928.

According to a report received by the Department of Overseas Trade from His Majesty's Consul-General at Hamburg a drop in the volume of traffic through the Kiel Canal was apparent during the month of November, 4,445 vessels aggregating 1,890,770 net reg. tons passing through the canal, as against 4,709 vessels of 2,110,210 net reg. tons in October. Of the 4,445 vessels, 2,410 were registered as sea-going steamers aggregating 1,734,223 net reg. tons, 36 of total net. reg. tons of 28,089 tons as motor vessels, 2,276 were cargo and passenger vessels aggregating 1,727,063 net reg. tons., 120 tugs aggregating 5,830 net reg. tons, 14 fishing steamers of 1,330 net reg. tons, 1,803 sailing vessels aggregating 96,437 net reg. tons, and 178 were lighters and barges of together 49,317 net reg. tons.

The vessels were loaded as follows: Four with passengers, 209 with coal, 54 with stone, 65 with iron, 546 with timber, 589 with grain, 29 with cattle, 809 with ores and other goods in bulk, 1,085 with piece goods, 84 with general cargo, 881 with empty or in ballast (about 20 per cent. of the whole traffic).

The decrease in traffic is attributed to trade being less during the winter months.

Personal enquiries regarding shipping and transport matters should be made at the City Office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

Port Marghera: The Industrial Harbour of Venice.

By ROY S. MACELWEE, B.S., M.A., Ph.D., M.A.S.M.E., S.T.E., Commissioner of Port Development, City of Charleston, South Carolina.

I.—GENERAL DESCRIPTION.

VENICE, the romantic, of moonlight nights and serenading gondoliers, of exquisite and individual Romanesque, Gothic and early Renaissance architecture, of narrow canal streets, and pattering feet across little arched bridges, summons no ideas associated with heavy industry; yet Venice cannot live by tourists alone, by the receipts from bags of corn to be fed to the ravenous pigeons on the Piazza San Marco, nor even from the sales to tourists, beguiled into lace-making or glass-blowing workshops. These are all valuable sources of income, but do not mean much progress; not progress capable of maintaining the pace set by the Duce.

Venice, the unusual, the beautiful, exists because of the great commerce of the Middle Ages when Venice was the transshipping point between the Levant and a great trans-Alpine hinterland. The advantageous geographical position still maintains, although this hinterland in modern times is hedged about by competitive zones, Genoa on the west, Trieste on the east, and Hamburg, with the aid of the Elbe River reaching down from the north even beyond Vienna. With a restricted hinterland the local city commerce alone would never be sufficient to make a world port.

The logical conclusion is a plan for Venice to build up an immediate hinterland of its own, tributary exclusively to the Port of Venice, by promoting the location of heavy industries around the port city. Venice has taken advantage of the great industrial expansion of Italy, going forward with acceleration under the enlightened efforts of Premier Mussolini, whose

railroad and rail yard possibilities, was the logical choice for expansion. To reach it would require a new ship canal, as at Miami, Tunis, and perhaps as suggested at New Orleans through Lakes Borgne and Pontchartrain. The new ocean and industrial port is planned on a scale two or more times the area



A Large Flour Mill on the left side of the Canal Della Giudecca.



The Principal Anchorage of the Old Port of Venice. St. Mark's Canal from St. Mark's Place.

personality has galvanised into energy of the nth power the capabilities of the fine Italian hands, by infusing a new spirit of effort and progress into the souls of present-day Italian citizens.

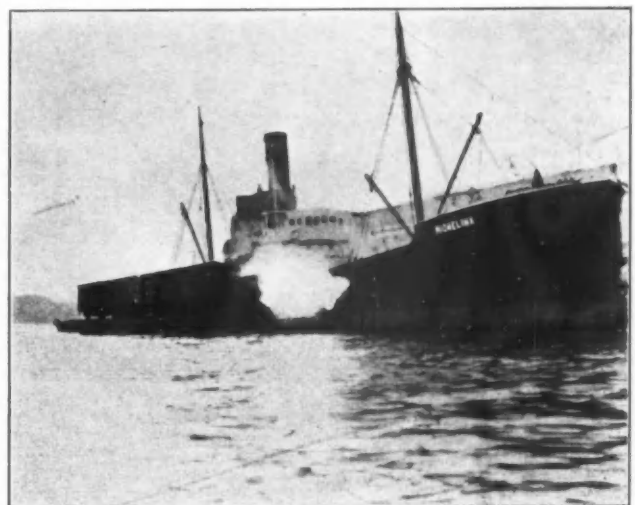
The location of heavy industries requires as the first and foremost factor cheap transportation for raw materials and finished products, and cheap transportation is only possible where direct mechanical transfer between ocean ship, river barge, motor truck and railroad is provided. The elimination of rehandling through modern facilities is only possible at a modern industrial port properly designed. The same geographical location at the head of the Adriatic with the lower Simplon Pass to Northern Europe that made mediaeval Venice great, holds good to-day. But the greatly increased sizes of industrial units and transportation carriers, both land and water, require proportionately larger industrial locations and terminal facilities.

But Venice, a medieval town, walled by lagoons instead of ramparts, found it difficult to expand as Paris, Cologne, or Nuremberg did by simply jumping the walls and going out into the country. Venice, to expand, found it necessary to cross the lagoon to the mainland. Old Venice occupies about such a position as the new islands in Biscayne Bay at Miami, Florida, the Lido being Miami Beach and the little railroad shop town of Mestre simulating Miami. The distances are greater than at Miami. It is evident that no great ocean port development, and certainly not a great industrial area, could take place at Venice, with its one railroad bridge the only connection. Therefore, the mainland opposite Venice across the lagoon, with its almost unlimited area of swamps and lowlands, and its adequate

of the entire city of old Venice. It is called Port Marghera, taking the name from Fort Marghera guarding the Mestre—Venice railroad causeway and bridge. This new industrial port of Venice, Marghera, includes ocean steamship facilities, extensive industrial terrain and a new garden city residential section. A large part of the work is already finished, and many industries are in operation; yet the work is hardly ahead of the demand for sites.

THE PORT OF VENICE LAY-OUT.

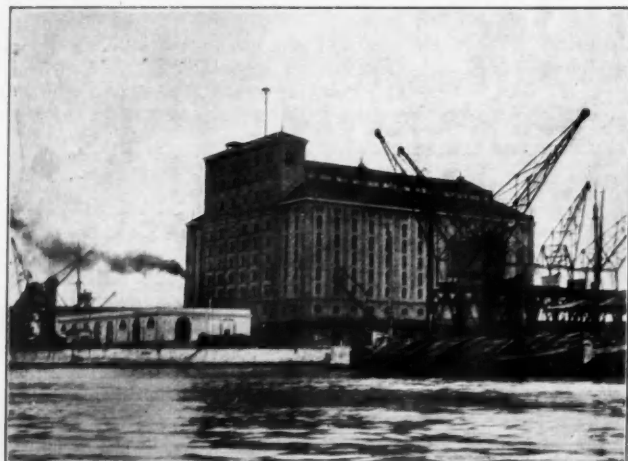
The Port of Venice is approached from the south-east by the Port of Lido Canal, six kilometres (3.7 miles) long, between long curved protecting jetties. The canal has a bottom width of 150 metres (493-ft.), depth 12 metres (39.5-ft.), sides on a slope 2:1. The channel turns 90 deg. to the left and wanders along past Venice as the San Marco Canal, San Marco Basin and the Giudecca Canal. The usual anchorage for passenger vessels is between the Piazza San Marco at the mouth of the Grand Canal and the island and church of San Giorgio Maggiore, but a landing stage is provided on the north quay of the Giudecca Canal, serving the mail steamers of the Lloyd Triestino.



Car Float alongside of Vessel at the Old Port of the Canal Della Giudecca.

The Giudecca Canal has a bottom width of 150 metres (493.5-ft.) and a depth of 10 metres (32.8-ft.). Along both sides of this canal is the first port development area, with several warehouses. Railroad cars are car-floated to these terminals or alongside vessels occupying these berths.

The next port development works, known as the "Stazione Marittima" (Maritime Station) are two quay-piers between the Canale Scemenzera, the Bacino di Levante and the Nuovo Bacino. These quay-piers, Molo di Levante and Molo di Ponente, are comparatively modern with shed, warehouse, rail siding and electric crane equipment. This Stazione Marittima is new land reclaimed from the lagoon. However, the rail connections must come over the long railroad bridge from the mainland.



Modern Grain Elevator of the Stazione Marittima on the Molo di Levante.

STAZIONE MARITTIMA STATISTICS.

The total length of waterways from the Lido and Malamocco mouths to the Maritime Station is 32 kilometres (20 miles). The total water surface (170 hectares), 420 acres; the total length of Venice quays in the year 1913 was 3,095 metres (about 2 miles); in the year of 1927, 4,226 metres (about 2 2-3 miles); and in the year 1928, 4,900 metres (about 3 miles); under construction at Marghera, 10,000 metres.

The total traffic of the port in ships and net registered tons:—

| Year. | Net Registered Tons. | Cargo Tons. |
|-------|----------------------|-------------|
| 1913 | 2,266,000 | |
| 1919 | 1,265,000 | |
| 1927 | 1,776,640 | 1,188,019 |
| 1928 | 1,985,000* | 1,275,058 |

Mechanical Equipment.—55 electric cranes, 6 coal tipples, 1 electric crane for marble trade.

MORE TERMINAL FACILITIES NEEDED.

Further port development on out into the lagoon at this point, even with an additional railroad bridge, would inevitably result in chronic railroad congestion. Across the lagoon was idle swamp land of little value. A ship canal to that large area, with space to work out a comprehensive port and industrial plan, was not more expensive than a new railroad bridge to Venice.

Also, there were other reasons for carrying the Port of Venice across the lagoon. Encroachments upon the water area of the lagoon would reduce the flushing process of the ebb and flow of the small variation of the tide through the canals of Venice, with bad sanitation as a result. Furthermore, large



The Sinking of a Concrete Caisson which has reached the compressed air stage, about half sunk. The New Venetian Port of Marghera.

industrial and port works would detract from Venice as the most unusual city in the world, and, as such, its attraction of

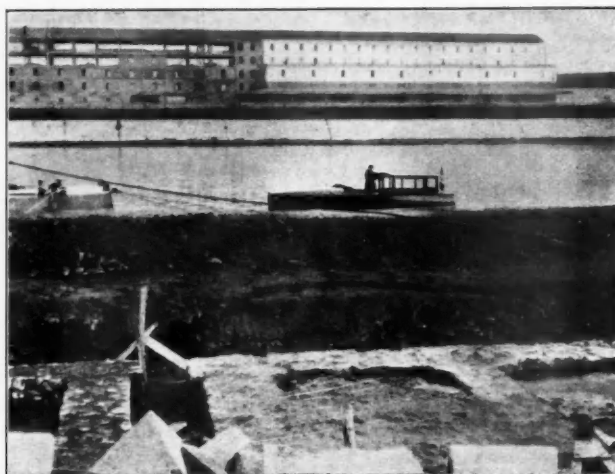
hundreds of thousands of tourists is of great business value. And, too, Venice needed suburbs for its growing population.

THE VICTOR EMANUEL III. CANAL AND THE NEW HARBOUR.

With these considerations in 1917 it was decided that the Giudecca Canal was to be continued past the Maritime Station for a distance of 4,100 metres (2.54 miles) and called the Victor Emanuel III. Ship Canal. It has a bottom width of 50 metres (164-ft.), 10 metres (32.8-ft.) depth, sides sloped 2:1. The straight course is clearly marked by piles. After suffering the setbacks and delays of the World War, the canal was opened by King Victor Emanuel III. in May, 1922.

On this canal, or more properly stated, branching from the right or north-eastern bank of the canal, is the Petroleum Products Basin with 500 metres (1,640-ft.) of berths, pumping stations, and a large filled area for tanks, provided with rail sidings connecting with the railroad system at Mestre. At the termination of the 4,100 metres the Victor Emanuel III. Canal branches three ways; to the right (45 deg. turn), the Brentella Canal 40 metres (131-ft.) wide at the bottom, 7 metres (23-ft.) deep, serving the east side of the northern industrial area; the Northern Industrial Canal 60 metres (197-ft.) bottom width, 9 metres (29.5-ft.) depth, and 2,500 metres (8,200-ft.) long.

At the end of the North Industrial Canal the waterway passes under a wide bridge of sufficient clearance for barges and lighters and turns at right angles to the left, forming the terminal basin of the Western Industrial Canal, 100 metres (328-ft.) wide and 2,000 metres long (6,560-ft.). This canal again turns to the left, forming the south branch, thus encircling the commercial and a portion of the industrial port of Marghera. At the south corner of this canal is a junction canal for inland navigation, joining Port Marghera with the Brenta Canal (Naviglio di Brenta). Future plans contemplate the extension of the West Canal with numerous branches to open an additional industrial area that will more than double the present layout.



View across the New Quay Walls, with Caissons sunk to level, Basin No. 1, Port Marghera. The earth ridge between the motor boat and the quay wall will eventually be dredged out.

The third branch is 45 deg. to the left from the Victor Emanuel III. Canal, opposite the Canale Brentella, to serve the basins of the commercial port and to reach the south branch of the Western Industrial Canal.

COUNT VOLPI DI MISURATA.

The dynamic prime mover of the new commercial and industrial Venice conceived and planned by Professor Enrico Cosenza, was the world-known first Venetian and great Italian, Senator Giuseppe Volpi, heading a group of Venetian industrial firms, anxious to secure to Venice the means of an important economic development.

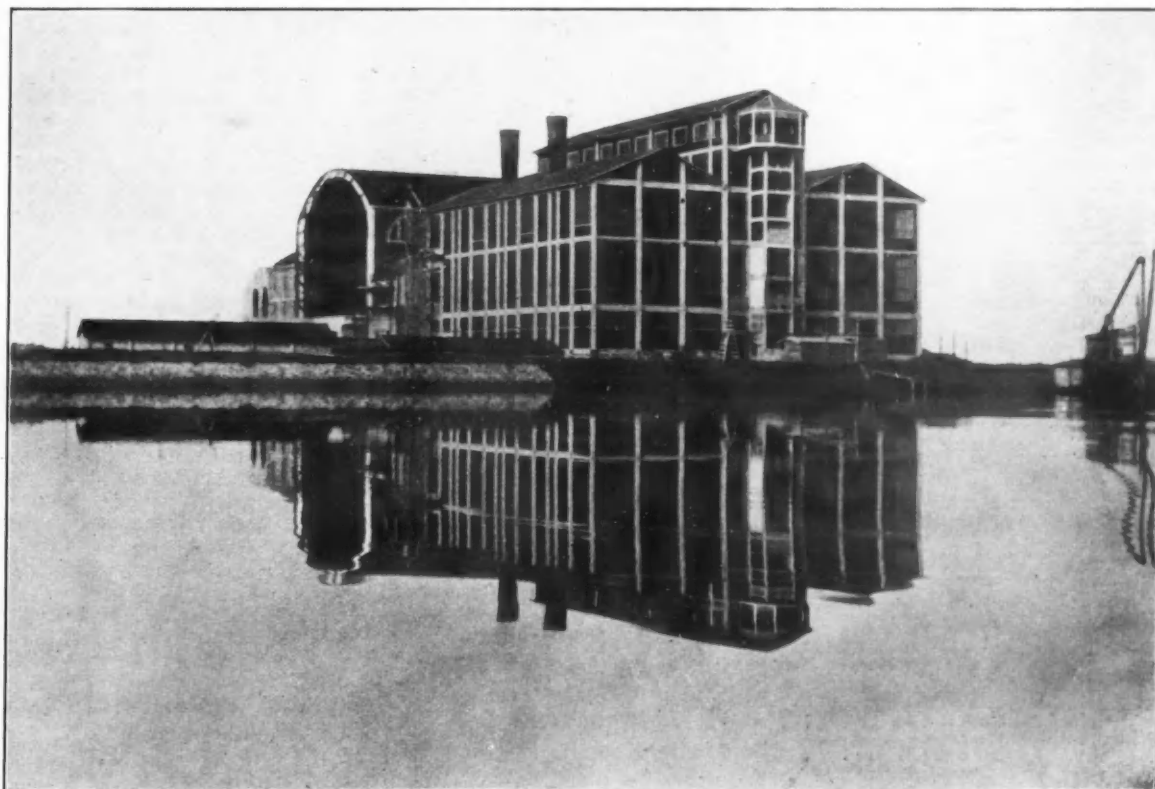
Count Giuseppe Volpi di Misurata, the founder of the Port of Venice in its modern form, has had a most interesting career. He was born in Venice in 1877 of a noble family from Bergamo and Trieste, which had established itself in Venice. After studying at the University of Padua, his restless and dynamic energy started him on his adventurous political and financial career. At the age of 20 he left the University of Padua and travelled extensively in the Near East, where he eventually founded commercial, steamship and railway companies, tobacco monopolies and trading posts. His early activities met with financial success, and built up his fortune as well as an intimate knowledge of world politics, especially the Teutonic *Drang Nach Osten*, that was one of the main causes of the World War. The Italian Government used his exceptional skill and services for Near Eastern missions, especially during the Balkan Wars as a plenipotentiary, in 1912. In 1913 he was vice-president of the Balkan Financial Conference in Paris. Again after the World War, in 1919, he was a member of the Supreme Economic Conference in Paris and a delegate to the Peace

* Estimated on basis of first 7 months.

The Port of Marghera.



Bulk Unloading Plant of the Montecatini Company on the North side of the North Industrial Canal Company, manufacturers of chemicals and fertilisers. Elaborate Cable Bulk-handling Machinery on the North Canal,



The Thermo Electric Plant of the Adriatic Electric Company, on the West Industrial Canal.
(Sociata Adriatica di Electricita).

Conference, and the following year again represented his Government on various secret missions having to do with Balkan affairs.

During all of this period of diplomatic service to his Government, Count Volpi was directing the formation of the most important financial, commercial, and industrial groups in Italy, one of which is the Adriatic Electrical Company, including hydro-electrical plants in Venice—Emilia and Venice—Giulia, which controls some of the greatest railway, mechanical, and steamship industries of Italy. It was during this period that he was the dynamic moving force for the expansion of the Port of Venice that was conceived and planned by Professor Coen Cagli. With Count Volpi's organising ability and prestige, there arose within a few years from uninhabited swamps one of the greatest industrial areas of Italy, and potentially one of the greatest industrial areas of the world, but so removed from beautiful Venice that not one tourist in ten thousand—unless he looks for it—will ever know that this new industrial Venice exists. Count Volpi's port promotion work was practically finished when he was nominated Governor of Tripoli in July, 1921, where his political and organising ability established complete occupation, law, order, and physical improvements over a great area 500 kilometres south to the Sahara. Always a builder, he developed and beautified the City of Tripoli, constructing seaside promenades, restoring ancient edifices, and stimulating private activities, and made Tripoli one of the most beautiful towns in the Mediterranean. He even had time to take a personal interest in archaeology and the excavation of the ancient Roman-African towns of Sabratha, Leptis Magna, and the important discovery and excavation of Septimus Severus—the most imposing buildings and art treasures of Roman civilisation in Africa.

In 1925 Count Volpi, returning from Tripoli, received high honours, titles and decorations from the Crown, including the name Volpi of Misurata, the town about which centred his great conquests, similar to Kitchener of Khartoum. He was made Minister of Finances, in which capacity he was successful in checking the fall of the lira, brought the Budget measurably near a state of balance, and, personally, in Washington, negotiated the settlement of the Italian War Debt with the United States in 1925, and with Great Britain in London in 1926.

A harbour development, as in Venice, takes on a new significance when it is the product of such a wizard of business and political organisation as Count Volpi and designed by an engineering genius like Coen Cagli.

COEN CAGLI.

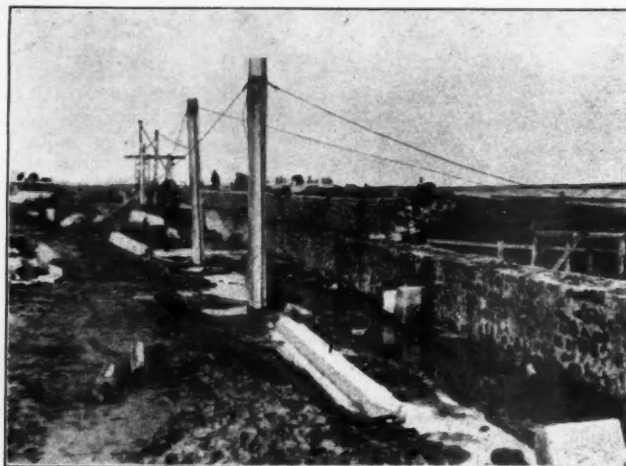
The original project for an extension of the port on the mainland was planned by the eminent civil engineer, E. Cucchini, and the late chief engineer, F. C. Rossi, and authorised by the State in 1907. With the passing of the years, the War and the extent of the work, the growth of the size of vessels, and the demands of commerce, made a new study necessary. In 1917 a new port company was authorised by the Italian Government, and the Municipal Government of Venice. The fine Italian hand of Coen Cagli, who was made managing director of the industrial port, began to be seen. He re-designed the industrial-commercial port layout and enlarged all the canals to the dimensions given, in many cases more than twice those of 1907. Coen Cagli is a port and harbour engineer of surprising brilliance; designer, constructor, linguist



After Sinking the Caissons, the Wall was built up with a granite face and boulder masonry fill.

as well as mathematician—a rare combination—and the most genial good company. Graduating number one in civil engineering from the University of Padua in 1891, he has been closely identified with many of the exceptionally fine port engineering works of Italy, having been resident engineer of Port Civita Vecchia in 1896, the Port of Naples 1897-1905, Antivari in Montenegro, 1905, Port of Genoa, 1907-1910, chief engineer of Genoa, 1911-1919, and designer of the extension

of the Port of Genoa. He is the founder of the Industrial Port of Venice Company, 1917, and now general manager of this port. He was the author of plans now in execution of the Ports of Leghorn and Catania, 1919-1923. He has been professor of maritime engineering and inland navigation at the Institute of Engineers at the University of Padua, Italy, since 1909, until 1926, when he was transferred to the Institute of Engineers of Rome. As secretary of the Royal Commission to



Quay Wall rising above the Foundation. The Piles to close the opening between the foundation caissons are being sunk.

improve and extend Italian ports, 1904-1907, he drew the plans for the extensions of more than twenty ports. He has been a member of many commissions representing Italy abroad, including the International Navigation Congresses at London, 1923, and Cairo, 1926. He is the author of many published works, including reports upon experimental research of wave action on breakwaters which have resulted in much improvement in breakwater design. His discourses in Italian, French, German, or English is as lucid, direct and exact as the despatch and precision with which he builds up a breakwater against the heaviest seas in the Mediterranean, or sinks a concrete quay wall caisson to level—11 metres. Naturally, his clip of decorations and list of honorary degrees and memberships is lengthy in proportion to his scientific achievements. He was elected an honorary member of the Society of Terminal Engineers (U.S.A.) in 1927.

II.—ENGINEERING FEATURES.

The Industrial Port of Venice layout consists of a series of quay piers of land filled with dredge spoil from excavating the basins. Three moles (quay-piers) and basins may be continued to the south for some miles along the lagoon shore if commerce warrants. The plan assures adequate room for expansion for an indefinite period, each addition conforming to conditions as they may be at the time the extension is desired.

With minor variations the quay-piers are 220 metres (721-ft.) wide by 1,000 metres (3,280-ft.) long, with the basins from 200 to 250 metres (656 to 820-ft.) in width between quays. The approach canal is 250 metres (820-ft.) wide, with turning basins (made larger by cutting off the corners of the piers) of 300 metres (984-ft.) diameter. The future industrial canals are estimated at 100 metres (328-ft.) width, with a 250 metres (820-ft.) turning basin at each junction point. The quays are served by numerous rail sidings and ample supporting, break-up and classification yards laid out in the same direction as the running lead tracks from Mestre.

Statistics of Port Marghera (January 1st, 1928).

Total length of waterways (16 kilometres), 10 miles; total water surface (175.5 hectares), 435 acres,

(a) **Commercial Port** (in construction—first period).—Total length of quays (2,200 metres), 1.37 miles.

(b) **Industrial Port** (in the present limits).—Total length of berths (17.2 kilometres), 10.7 miles; total length of roads (16 kilometres), 10 miles; total length of railways (33 kilometres), 20½ miles; total traffic in the year 1927, about 500,000 tons.

(c) **Garden City** (in the present limits and situation).—Total area (200 hectares), about 500 acres; total length of roads (18 kilometres), 11.2 miles; number of buildings already constructed, about 350; inhabitants living there to-day, over 6,000.

Quay Construction.

| | TRAFFIC. | |
|------------|-----------------|------------------|
| | 1926 | 1927. |
| Discharged | 307,837 m. tons | 433,116 m. tons. |
| Loaded | 38,773 m. tons | 26,924 m. tons. |
| Total | 346,610 | 460,040 |

33 per cent increase.

The quay construction is of the masonry wall on cellular caisson blocks, or box type, cast in place and sunk below basin bottom by digging the earth out from the cells. The boxes sink by their own weight, cutting edges being provided to assist their descent, and depend upon their own inertia for their equilibrium.

The Port of Marghera.

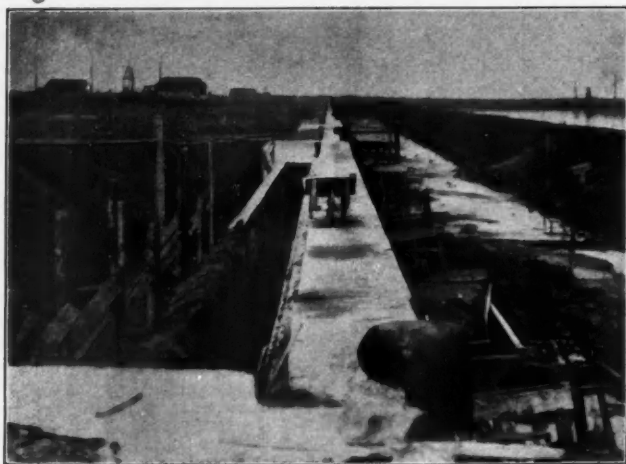


Aerial View looking Seaward across the North Canal, the Petroleum Harbour and the Lagoons,



Port Marghera from the East.

The works have gone forward with rapidity and precision of the fineness of Venetian tooled leather or ornamental glass. Coen Cagli's port works construction is a joy to inspect. The quay wall line running along the mole embankment is first enclosed, on the basin side, by an earth dam to shelter the work yard from the high waters and to permit suction dredges to work on the excavation of the basin. After the wall is completed, the remainder of the basin width, up to the wall, is excavated and fill pumped back of the wall.



The Quay Wall with its stone crown and cable trough-tunnel nearing completion. The area on the left will be filled in. The area on the right will be dredged to nine metres.

The masonry cellular blocks are constructed as a reinforced concrete caisson, cast in place, built up as a compressed air working chamber. As the concrete is of a rich mixture, two to three months are allowed for the caissons to set or cure. The cellular blocks are 15 metres long (49.2-ft.), 6.60 metres wide (21.65-ft.), and 9.70 metres high (31.8-ft.); their roof has three 1-metre (3.28-ft.) circular holes for filling in the chimneys of an air lock when the caisson has been sunk to the level where the loose sandy stratas of the subsoil begin to leak water. The outside walls are 1.25 metres (4.1-ft.) thick, and the two transverse bulkheads 1 metre (3.28-ft.) thick. The three inner cells of 4 metres by 3.33 metres horizontal section (13.11-ft. by 10.91-ft.) are closed at their top by an arched concrete roof on a radius of 3.50 metres (11.48-ft.) and 30 cm. (1-ft.) thick at the centre.

The process of work is to cast on the ground the parallel-piped concrete caissons on the line, with 0.50m. (1.64-ft.) spaces between them. By the end of three months of successive caissons construction the building up and sinking of the first and then successive blocks are begun. "Sand hogs" (caisson workmen) are let down through the manholes in the bottom and begin excavation, the spoil being passed up through the three holes of the caissons. As the excavation proceeds, the caisson sinks, the outer rim acting as a cutting edge, until sunk to level—10.5 metres. In these works the compressed air became necessary at about 5½m. (18-ft.) below mean high water datum. The remainder of the sinking proceeds rapidly to place at 10.5 metres (34.44-ft.) below M.H.W. The air pressure bubbling past the cutting edge and up the outside of the caisson, acts as a lubricant or water jet effect. Having reached place level, excavation is continued toward the centre of the foundation to 11 metres (36-ft.) or ½-metre below the caisson edges. If the subsoil develops loose spots, ferro-concrete bents or benches 2-metres long and 50-cm. high are pushed outward under the caisson cutting edge as needed to insure against further settling or cutting. The core or base carried 50-cm. deeper when filled with the mixture of weak concrete and stones acts as an additional anchor against a possible tendency to lateral movement. The cells are now filled with sand. The inertia of the quay wall cells will resist any outward thrust of the fill back of the wall.

The spaces of about 50-cm. (1.64-ft.) between the blocks are now stopped on the land side by driving a concrete pile (jetted down where necessary, but the sand around the blocks is still soft). A concrete slab is also placed across the space on top of the blocks, a ledge in their walls having been left as a seat for the slab.

The tops of the cellular blocks are now at —.80 metres (—2.62-ft.) below M.L.W. The future waterline (the tidal variation being very small) from —.80 to +.20 (3.28-ft.) is opposed by two courses of cut granite blocks 40-cm. high (1.31-ft.) by 80-cm. wide (2.62-ft.), and 60-cm. by 60-cm. (1.97-ft. by 1.97-ft.) respectively above the granite. The wall is crowned by a masonry wall with facing 1.80m. (5.9-ft.) in height and 2.40m. (8.77-ft.) wide, carrying a conduit .80 by 1.00m. (2.62-ft. by 3.28-ft.). This wall is capped with a cut stone coping 40 by 90-cm. (1.31-ft. by 2.95-ft.). The top of this crown is at + 2.40 (8.77-ft.) above M.H.W., or 3.20 m. (10.5-ft.) above the top of the blocks that form the quay

foundation. The inshore side is filled to level and paved where necessary, usually with granite cubes.

The cost of this wall, even with the loose subsoil conditions requiring compressed air work, on the bases of the first 1,085-m. (4,000-ft.) of construction, is 2,600 gold lire, \$520 per lineal metre, which is \$160 a lineal foot. The construction should last indefinitely. The work has proceeded with rapidity, ease, safety and accuracy.

Basin excavation is carried on mainly by ladder dredges and suction dredges. The canals have been partly dug by bucket conveyor excavators moving on land tracks and discharging into narrow gauge dump wagons. Until January 1st, 1927, over 6,000,000 cubic metres of material were removed. The cost was about 2.20 lira gold (pre-War) or 42 cents per cubic metre (1 cubic metre equals 1.3 cubic yards); therefore, for 32 cents the cubic yard.

III.—PORT PROMOTION.

The obvious objective of an industrial port is to afford such economies in the handling of materials that great industries will locate and succeed at the port city, adding to the wealth of the community. Some advantages claimed for the specific industrial port of Venice—Marghera may be enumerated:—

The entire industrial zone is in the immediate vicinity of the Mestre railway line and the important railway junction point of Mestre, to which all industries may be connected by railway sidings.

Canals are of ample depth to receive ocean-going vessels of considerable size directly alongside the industrial plants. The River Po offers inland waterway barge service from the port across a highly developed industrial area of northern Italy.

The great Venetian water-main passes near the area, making possible, at low expense, adequate water supply.

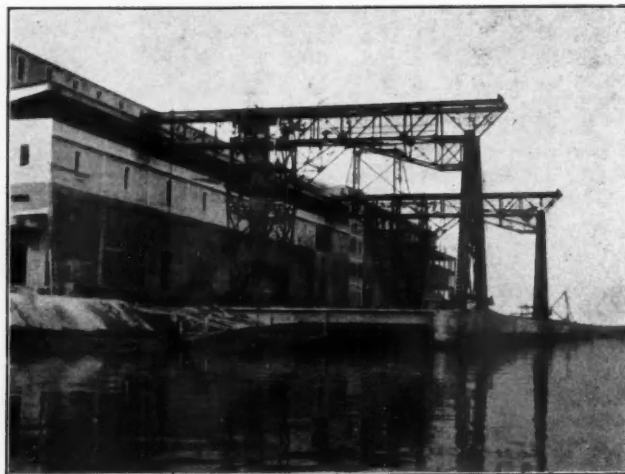
Likewise, high-powered electrical transmission lines pass within easy tapping distance from the industrial area.

The waters of the lagoon are so extensive and so thoroughly flushed by tides that adequate drainage from the plants into the lagoon is possible.

The industrial area is considered a free zone for the manufacturing of imported materials thus extending the manufacturing in bond principle without any of the irksome customs surveillance. The area has free port features.

The industries are exempted from all duties on building materials, machines, and other essentials to the plant construction and subsequent extensions, executed within a period prior to December 31st, 1936.

The industrial area is so large and its parts of such a variety of shapes that industries of almost any size or peculiarity in processing layout can find accommodation. Also by being grouped together, co-operative advantages of water power, switching, etc., are enjoyed to a greater extent than if the plants were isolated.



New Industries rising rapidly along the Canal. The Unloading Machinery for a Salt and Tobacco Warehouse. Emporio Sali e Tabacchi.

THE METHOD OF FACTORY SITE DISPOSAL TO INDUSTRIES.

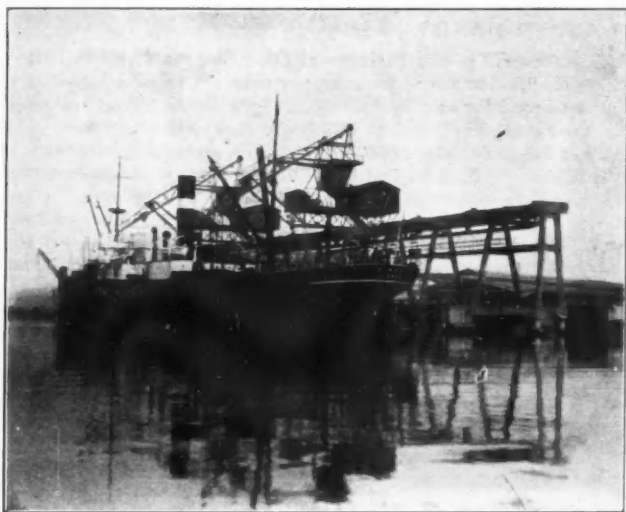
The average price paid by the Industrial concerns to the Porto Industriale di Venezia Company, representing the net reimbursement of the expenses sustained by the latter, has been as follows: For the areas of the North Industrial Zone it amounted to 1.45 lire (paper currency) per square metre, corresponding to about 7.6-c. American money. The average price for the areas of the West Industrial Zone will be about 2.75 lire, corresponding to 14.5-c. (1 lire equals 5.3 cents.). In addition to this price, the buyers of the areas are now charged 4 lire per square metre, which is divided. Half goes to the municipality of Venice as a contribution to their costs of construction of municipal works such as streets, sewers, lighting, policing, fire protection and other public services. Half goes to the State Government to form a reserve fund for complementary work in

line with the object of the concession to the Porto Industriale Company, or industrial and commercial development.

Although the areas are sold outright to industrial firms, the City of Venice retains a certain amount of control over the development and use of the area in the terms of sale. All plans for the utilisation of industrial areas must be previously submitted to the Municipality of Venice. When the areas are sold, the Municipality loses all further control and power over them.

There are no restrictions as to the type of constructions on the areas sold, but the plans of all works to be constructed on such areas must be previously approved by the Municipality of Venice, as stated above. The plans of all works to be constructed on the areas or water surfaces granted by the State must be approved by the local state offices, Magistrato alle Acque, the Port Authority.

The canals and basins of the Industrial Zone belong to the State, which generally owns the water frontages as well. There are some instances of industrial concerns (shipyards) owning the water front above the sea level, and in this case they are obliged to protect it at their expense by appropriate works and to assure their regular maintenance. In all other cases the revetments are constructed and maintained by the State, which may grant, under certain conditions and at a certain tax rate, the waterfront as well as the water surface and the nearby State property, for the construction and operation of wharves or quays.



Fertiliser and Chemicals Products Co. (Societa Veneta Fertilizzanti e Prodotti Chimici).

No general public wharfing business may be conducted by any owner or concessionaire (grantee) of a water frontage. An exception only is allowed in the case of a factory, firm, company or corporation with water front property at Marghera loading and unloading goods destined to or coming from other plants of the same kind belonging to the same owner as of the Marghera plant. It will be seen that no industrial concern buying waterfront property in the industrial port may go into the public wharfing business in competition with the publicly owned commercial wharves.

No revenue is received either by the Porto Marghera Company or by the Municipality from the waterfront after the sale of the abutting property. Only the State may receive a revenue in the case of the grant of waterfront, namely, half of 4 lire purchase price as stated above. The tax rate is fixed by the Port Authority and generally varies from 2 to 3 lire (10 to 15 cents, U.S.) per square metre per annum.

No dockage is charged against any vessels whatever lying alongside waterfront quays or wharves in the industrial canals. They are only charged the normal port dues, like all other ships entering a national port.

The new commercial harbour at Marghera is not yet in operation. When opened, ships and goods will be charged the same rates charged at the old commercial harbour, Stazione Marittima.

The railroads of the industrial zone are constructed and operated, under the control of the State Railways, by the Porto Marghera Company. The mean rate paid by the Industrial concerns to the Company for the transport of freight from their factories to the switch of the State Railways joining the terminal tracks to the Mestre Station, or vice versa, is 2.55 lire (13.5-c.) per metric ton (2,204-lbs.), of which 1.20 lire (6.4-c.) represent the actual cost of working of the port railway system, and 1.35 lire (7.1-c.), the interest and sinking fund quota for the capital invested by the Company in the construction of the railroads and their equipment. Besides this, the factories have to pay to the State Railways the ordinary switching (or junction) charges amounting to 16.10 lire (85.2-c.) per car entering the zone. These cars are usually of 10 to 20 metric tons capacity.

It is interesting to note that the City of Venice has not attempted to go into the real estate business, deriving profits from an industrial sub-division. Neither has the City of Venice attempted to retain the title to the land, but is perfectly willing to sell the property at cost, in fee simple, in order to induce industries to locate there in the greatest possible number and spend large sums in capital investments and payrolls in the community.

The result of this policy, as contrasted with the twenty-five year leases at Los Angeles and other similar leases at some new American industrial ports, has been an instantaneous response. Of 88 industrial sites laid out and ready for occupancy, 82 have been occupied by a long list of industries.

As the planning and construction is to be rated superior, so also the port promotion seems to be equally successful. Of the whole area until now developed for industrial purposes, covering about 5,500,000 square metres, or 1,358 acres, only 800,000 square metres, or 200 acres, are still unoccupied. About half a million square metres, or 125 acres, are occupied by roads and railway plants and sidings; while 4,200,000 square metres, or 1,037 acres, are reserved for industry, of which 2,300,000 square metres (586 acres) occupied by 42 factories in full work and 1,900,000 square metres (470 acres) by factories in course of construction. The largest single industries are: The Venezia Shipyard with 430,000 square metres (106 acres); the Breda Shipyard with 475,000 square metres (118½ acres); the Montecatini Fertilizer and Chemical Works with 300,000 square metres (74½ acres); the Italian-American Petroleum Company with 100,000 square metres (25 acres) in the petroleum products harbour, as well as the "Nafta" Italian Petroleum Company with 197,000 square metres (48½ acres). The major industries after the above are:—

Iron and steel warehouse shops, 4; iron wire; soaps and bleaching materials, 2; artificial stone, 2; insulating materials; building materials, 3; cement, 3; brick kiln; electrical transformer stations; freight forwarder, 2; pipe plant and warehouse; petroleum products tank park, 3; lubricating oil plant and tanks; carts and wheelbarrows manufacturing plant; cold storage; beads; agricultural products, stores and plant; distillery; woodworking plant, 2; wood preserving, 2; preserved fruits, plant and distributing warehouses; porcelain factory; glass plant, 3; railroad shops; locks; files; rice; electric power plant; vegetable oils; shipyard, 2; salt and tobacco warehouses; asphalt and bitumen; flour mills; brushes.

In other words, a typical assortment of heavy industries requiring extensive, inexpensive land and the cheapest possible handling and transportation. A glance at a few of the author's photographs (January, 1927) will show the extent of installation of handling machinery at shipside.

This is the sort of low production competition of the re-born Italy that the rest of the world must prepare to face.

[The photographs in this article were taken by the Author.]

SMALL CRAFT AND MATERIALS WANTED.

His Majesty's Vice-Consul at Bogota reports possible openings for small craft and other materials arising out of an agreement recently signed between the Colombian Government and a railway company in connection with improvements in the terminal and harbour facilities at Puerto Colombia.

United Kingdom firms in a position to offer vessels and materials likely to be required in connection with this matter can obtain further particulars on application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. (Reference A.X. 7443).

THE INSTITUTION OF CIVIL ENGINEERS.

The Institution of Civil Engineers are holding an ordinary meeting on Tuesday, February 5th, at 6 p.m. "The Regirding of the Railway Bridge over the Krishna River, Madras and Southern Mahratta Railway: Fourteen Spans of 150-ft.," by Harold Nugent Colam, B.A., Assoc.M.Inst.C.E., is the title of a Paper to be submitted for discussion.

An informal meeting will be held on Wednesday, February 13th, at 6 p.m., when the subject for discussion will be "Merits of Alternative Methods of Driving Auxiliaries in Modern Power-Stations," by Harry Philip Gaze, M.Inst.C.E. Mr. W. H. Patchell, M.Inst.C.E., in the Chair.

IMPROVED TWIN BOLLARD.

An improved twin bollard for checking and mooring ships and for use on board ships and yachts has recently been put on the market and is a great improvement on bollards previously in use at docks and harbours.

This twin bollard is much quicker and safer and more efficient than the present bollard for the purposes of checking and warping ships through locks and docks, and also means a vast saving on the wear and tear of ropes as less turns are required.

These twin bollards have been installed on trial at the lock entrance to the West India Dock and also on the new 1,000-ft. lock, Tilbury Docks.

Illustrations of this twin bollard appear in an advertisement amongst our advertisement pages, and further particulars can be had from the advertiser.

Port of Southampton Topics.

HOW TRADE HAS GROWN.

An interesting comparison of the work carried on at Southampton Docks in 1892 and that carried on there last year was made by Lt.-Col. G. S. Szlumper, Assistant General Manager of the Southern Railway at Southampton on January 17th, when the London and South-Western Company took over the docks in 1892 only 4,000,000 gross tons of shipping were handled in a year. Last year 32,000,000 gross tons were dealt with. This growth of trade and the increase in the size of vessels has involved an enormous expenditure on dredging berth accommodation and equipment. The amount of cargo handled has grown since 1892 from 400,000 tons annually to 1,250,000 tons and is still growing. Of this tonnage the little cross-channel steamers of the Southern Railway handle as much as 33 per cent. The passengers using the port have increased from under 200,000 in 1892 to over 500,000 last year, and the Southern Railway boats handled just over 50 per cent. No fewer than 13 liner companies have come to the port since the docks resumed normal operations after the war. There is no reason to suppose, says Col. Szlumper, that there will be any diminution in the attractiveness of Southampton as a port.

THIS YEAR'S WORK ON DOCKS SCHEME.

The next few months will see big progress made with the great dock extension scheme now in progress on the Western Shore, Southampton. With what has been done up to the present the Southern Railway Company have good reason for satisfaction for the preliminary work has been done thoroughly if, from the casual observer's point of view, a little slowly. Five dredgers are now employed on the work of excavating the new deep channel and already 3,000,000 tons of spoil have been lifted. Should, however, the present rate of progress be maintained throughout the year only about half of the total quantity of spoil which is to be dredged, will have been dredged. At present the principal work in hand is the building of the reclamation banks around the area to be reclaimed, but it is anticipated that towards the end of the year the actual reclamation of the first 170 acres will be begun. During the year the construction of the embankment and viaducts for the approach railway from Millbrook to the new docks will have progressed considerably. The sinking of the monoliths for the new quay wall will be undertaken towards the latter part of the year. Some of the steel monolith shoes which have already arrived, are being erected. The sea wall and reclamation between the Royal Pier and the Town Quay are now completed and the new pier entrance which has had to be built in order to give better approach to the site, will be finished by about the middle of the year.

REASONS FOR OPTIMISM.

Impartial observers of events in the shipping and general commercial world seem agreed that there should be no diminution in Southampton's progress in 1929. There are many evidences which, indeed, indicated that there should be an appreciable increase in the number of liners using the port. The North German Lloyd liners, "Europe" and "Bremen," each of 46,000 tons, and the Holland-America liner "Statendam" (30,000 tons), will be placed in commission during the year and each will make Southampton a port of call. According to present arrangements the "Statendam" will pay her first visit to the port on April 11th, but it is likely that the other two vessels will be seen on their North Atlantic run before June or July. The year should see a big development—or at least the beginning of a big development—in Southampton's association with New Zealand shipping. The New Zealand Shipping Company will commission three new liners—the "Rangitiki," "Rangitata" and "Rangitane"—which will sail from Southampton. The P. and O. line have also given proof of their intention to make more use of the port, having intimated that during the summer months the Viceroy of India, as well as the Ranchi, will begin and terminate its voyages here.

TIMBER TRADE FACILITIES.

One of the most welcomed features of 1928, so far as port activity was concerned, was the increase shown in the cargo returns over those of the previous year. In no small measure was the increase in cargo trade due to the development of the timber trade. The timber trade of the port was fairly well established in pre-war years, but to a large extent it was lost while the port was required almost solely for embarkation purposes. The Southern Railway Company set itself the task of regaining these lost traders when the port was released for commercial purposes and by the improvement of storage facilities for timber, succeeded in its object. Shipments increased so rapidly that four years ago the company found it necessary to build a fine near shed. This and the old accommodation soon became heavily taxed. They have now decided to build a new timber storage shed at a cost of £12,500 this year.

This shed will not be so large as that built four years ago, which is able to accommodate 72,000 square feet of timber. The

construction of the shed will be begun within a week or so and when completed the shed will be 300-ft. in length, 60-ft. in breadth and will be able to take stacks of timber not exceeding 20-ft. The extent of the development of this valuable side of dock work can be appreciated when it is stated that in 1925 the total importation was 28,365 tons and in 1928 had risen to 33,491 tons. Besides this it is estimated that about 30,000 tons were dealt with at the riverside quays on the Itchen and Test.

BUSY JANUARY.

Despite the fact that this is supposed to be the dead season for transatlantic travel no fewer than 27 vessels sailed from Southampton for New York during January. This is a striking indication of the hold the port has obtained upon this route. Though on eleven days during the month there were no sailings, on other days two or three vessels sailed in quick succession. A number of vessels also left the port on cruises. The German African Services had eight vessels at the port and it is noted with satisfaction that the services to West Africa, the Cape and East Africa are being well patronised. The inauguration of the outward service of the Aberdeen and Commonwealth Line also took place. The ships of this line have called at Southampton on their homeward run for some time, but the sailing from the port of the "Largs Bay" on January 23rd marked the initiation of the outward sailing experiment. This step is of interest as it means the provision of the fastest short sea route to Australia.

CHANGED HANDS.

The goodwill of the business of Day, Summers and Co., Ltd., which closed down a short time ago, failed to find a buyer when it was offered for sale by auction, despite the fact that the firm's reputation as ship-builders was known all over the world. The highest bid was only £950. The firm's waterside property, all of which is freehold with the exception of one small portion held on a long lease, covered 18 acres and included 3½ acres of mud berths. This was sold for £25,000 to Mr. George Levy, managing director of Messrs. George Cohen, Sons and Co., Ltd., 600, Commercial Road, London. The new owners of the property are constructional engineers, iron and steel merchants and steel foundries.

A NEW WHARF.

Medina Wharf, near Cowes, the principal unloading point for coal traffic in the Isle of Wight, is about to be rebuilt by the Southern Railway at a cost of £84,000.

Port of Rouen.

Traffic dealt with during 1928.

The total tonnage dealt with at the Port of Rouen during the year 1928 has been 6,902,314 tons—6,163,691 tons being imported and 738,623 tons exported. The export traffic is the largest ever registered. The total tonnage shows an increase of 391,567 tons over that recorded during 1927. This large increase is chiefly due to a record oil import, which amounted to 958,007 tons. Paper mills are responsible for another record traffic of 350,741 tons.

Exported commodities were mostly building materials for Sweden, Great Britain, Denmark, Canada, China and New Guinea.

Importation figures were: Coal, 3,153,227 tons; wine, 486,517 tons; timber, 382,423 tons; phosphates, 244,564 tons; ore, 252,204 tons; cobble stones, 52,252 tons; miscellaneous, 108,350 tons.

The 1928 traffic coal report shows that Rouen, which has for years been a leading coal harbour, is now second to none in the oil trade.

The oil import, which neared 1,000,000 tons, is bound to increase still more, thanks to the deepening of the Seine Channel, which will enable large tank steamers to reach Rouen with a full cargo.

FLOOD DAMAGES REPAIRED AT THE PORT OF MOSTAGANEM, ALGERIA.

In November, 1927, floods caused much damage in Algeria, the River Ain Sefran carrying over 150,000 cubic metres of silt into the Harbour of Mostaganem, and thus interfering greatly with shipping facilities.

One hundred thousand tons of spoils have now been removed and berths and channels dredged to proper depth, the remaining silt deposits being used as reclaimed grounds.

FIRE DESTROYS BIG LINER IN THE PORT OF MARSEILLES.

The mail boat "Paul Lecat," owned by the Messageries Maritimes was destroyed by fire on December 30th while undergoing repairs in the Marseilles Graving Docks. She was on the East Line.

Built in 1911, by La Ciotat Shipyards, her length was 161 metres, her breadth, moulded, 18.60 metres, her draught 9 metres and her tonnage 12,989 tons gross.

Belfast Harbour.

Full Official Story of the Year's Work.

From the 1st January until the 15th December, 1928, the net register tonnage of vessels cleared from the port totalled 2,957,500, representing an increase of 18,500 on the corresponding period of the previous year. The increase is comparatively small, but in view of the present state of trade, it is gratifying to see an upward tendency in the volume of shipping frequenting the port.

It is hoped that the year which has now been embarked upon will witness that recovery of trade and industry which has been looked forward to for a considerable time. The Harbour Commissioners appear optimistic, and are steadily pursuing their traditional policy of development and improvement.

During 1928 several important works have been completed, comprising:—

(a) The extension of the existing shed accommodation on the west side of Dufferin Dock by the addition of a bay 613-ft. by 71-ft., extending the full length of the shed.

(b) The widening of the Donegall Quay shed by 15-ft. for a distance of 965-ft., and the laying of concrete track in the centre of the sheds to facilitate the trucking of goods.

(c) The erection of a new shed and jetty at the south end of Queen's Quay for the accommodation of the Transatlantic passenger traffic.

(d) The provision of a new jetty on the east side of Musgrave Channel in connection with a ship-breaking business which has recently been inaugurated in the port.

(e) The construction of an additional bank on the County Down side of the harbour to enable a further area to be enclosed for reclamation purposes, together with the provision of a new jetty for the accommodation of the Board's reclamation plant.

(f) The installation of a 5-tons electric grab crane on the south quay of Abercorn Basin.

At present the Commissioners are engaged in carrying out large improvements, comprising:—

(1) Strengthening the northern portion of Albert Quay in order to carry electric cranes; the provision of three additional 5-tons electric cranes, and the re-arrangement of the railway lines along the whole length of the quay, thereby enabling the working space of the quay to be increased by about 1,800 square yards.

(2) The installation of three electric transporter cranes for the handling of cargo at Donegall Quay.

(3) The strengthening of the South Quay of Clarendon Dock by the provision of a new timber face-work extending along the end of the Dock.

(4) The re-organisation of the Harbour Workshops.

Several schemes of further development are in contemplation, but these are not sufficiently far advanced to enable particulars to be published.

In June last the Commissioners welcomed to Belfast Sir Alan and Lady Cobham in the flying boat "Singapore," which moored in Whitehouse Road at moorings specially laid down for the purpose.

The Fifth Destroyer Flotilla of the Atlantic Fleet, under the command of Captain Frank Elliott, O.B.E., R.N., arrived in the harbour, and Captain Elliott and the officers of the Flotilla were received by the Commissioners at the harbour office, and subsequently entertained at a reception and dance given in their honour, and at which a large number of other guests were present.

His Majesty's Battle Cruiser "Repulse," under the command of Captain Francis G. G. Chilton, R.N., also visited Belfast Lough in June last. Captain Chilton and his officers were welcomed to Belfast by the Commissioners and subsequently received at the harbour office and entertained at luncheon, together with a number of prominent citizens.

In July last, the Commissioners had also the pleasure of welcoming to Belfast Lough Captain Walter Lake, R.N., and officers of H.M.S. "Tiger."

It was with profound regret that the Commissioners during the year recorded the death of their esteemed colleague, Mr. W. J. Pratten, who had been a member of the Board for a period of fifteen years, and whose knowledge of engineering was of the greatest value to the Trust. The vacancy on the Board was filled by the election of Mr. James Mackie, D.L., who is head of the firm of Messrs. James Mackie and Sons, Ltd., Albert Foundry.

Mr. R. E. Herdman, D.L., J.P., with his ripe experience, general knowledge and great business capacity, still presides with the unanimous approval of his colleagues over the deliberations of the Trust.

The following is a statement of imports and exports of some of the principal items of merchandise at the port from the 1st January until the 30th November, 1928, as compared with the corresponding period of 1927:—

| | Imports | | Exports | |
|----------------------|--------------|--------------|--------------|--------------|
| | 1927 Tons | 1928 Tons | 1927 Tons | 1928 Tons |
| Aerated Waters ... | 96 | 71 | 6,333 | 5,099 |
| Apples and Pears ... | 7,309 | 6,557 | 271 | 694 |
| Bacon and Hams ... | 2,582 | 2,664 | 8,595 | 10,641 |
| Barley ... | 3,083 | 4,935 | 34 | 535 |
| Biscuits ... | 2,704 | 3,293 | 198 | 207 |
| Butter ... | 2,022 | 2,122 | 2,094 | 1,450 |
| Cement ... | 36,854 | 35,853 | 195 | 119 |
| Coal ... | 1,172,817 | 1,133,977 | — | — |
| Cordage ... | 36 | 65 | 6,441 | 8,012 |
| Cottons ... | 15,747 | 15,624 | 9,603 | 10,790 |
| Eggs ... | 517 | 447 | 17,677 | 16,645 |
| Flax ... | 20,205 | 13,440 | 908 | 1,407 |
| Flour ... | 77,917 | 68,271 | 2,100 | 4,566 |
| Fowl ... | 12 | 5 | 3,353 | 4,209 |
| Indian Corn ... | 263,242 | 232,138 | 49,851 | 27,276 |
| Iron Plate ... | 50,538 | 49,999 | — | 44 |
| Iron Wrought ... | 61,882 | 49,622 | 479 | 982 |
| Linen ... | 2,363 | 2,090 | 33,682 | 30,899 |
| Margarine ... | 2,942 | 3,021 | 10 | 7 |
| Oats ... | 1,662 | 3,172 | 1,819 | 997 |
| Potatoes ... | 199 | 765 | 120,926 | 120,818 |
| Rope ... | 287 | 337 | 1,668 | 2,083 |
| Soap ... | 3,848 | 3,801 | 360 | 422 |
| Sugar ... | 27,990 | 28,565 | 135 | 80 |
| Tea ... | 4,700 | 4,798 | 94 | 96 |
| Tobacco— | | | | |
| Manufactured ... | 1,882 | 1,637 | 2,738 | 2,804 |
| Unmanufactured ... | 3,562 | 2,849 | 536 | 305 |
| Wheat ... | 87,846 | 62,571 | 11,300 | 9,060 |
| Whiskey ... | 731 | 722 | 3,472 | 3,684 |
| Yarn—Cotton ... | 3,064 | 3,252 | 100 | 172 |
| Yarn—Linen ... | 5,911 | 3,350 | 4,573 | 4,228 |
| Cattle ... | 91 | 188 | 77,551 | 100,401 |
| Horses ... | 153 | 151 | 2,391 | 2,048 |
| Pigs ... | — | — | 10,812 | 5,607 |
| Sheep ... | 4,727 | 6,291 | 45,843 | 63,288 |
| Deals ... | 40,787 | 54,235 | 5 | 40 |
| Timber ... | 24,213 | 40,384 | 1,284 | 2,146 |

The Port of Hull's Advance.

The returns compiled by the Hull Chamber of Commerce and Shipping relating to the trade of Hull show that during 1928 the net registered tonnage of vessels which entered the port and paid dues was 6,508,281 tons as compared with 5,807,115 tons in 1927, and 6,691,818 tons in the pre-war 1913. The increase in the year is thus 701,166 tons, while the total is 183,537 tons behind 15 years ago. It is significant that at the old, or Town Docks, devoted to the Continental and Mediterranean trades there was a decrease of 38,460 tons and at the Alexandra Dock and Quay where the New York and South America trades are accommodated, the decline was 17,106 tons. At the King George Dock, which was not opened for traffic until July, 1914, and at the Saltend Petroleum Jetty the tonnage exceeded two-and-a-half million tons and have an increase over 1927 of 756,731 tons. In the net the port has apparently not only held its own, but has made a substantial advance, but the figures of net registered tonnage are apt to be misleading without some reference to the way they are composed. From all the available statistics the volume of the import trade would appear to have been at approximately the same level as in 1927, so that the increase of tonnage entering the port may be said to be due to many of the larger vessels, such as the Australian liners bringing smaller quantities of cargo and the greater number of vessels arriving in ballast to load coal for export.

Turning to the principal branches of the shipping trade we find that the quantity of wheat and kindred cereals imported at Hull during the year was 1,172,006 tons as compared with 1,388,561 tons in 1927, a decline of 216,555 tons equal to 15.6 per cent. Of the total of wheat alone no less than 687,496 tons came from the Americas, and decreased quantities from Australia and India. On the other hand there was a distinct improvement in the quantity of oil seeds, nuts and kernels imported. The total of 702,760 tons being just upon 100,000 tons better than in 1927. Imports of wool, chiefly from Australasia, at 66,000 tons compared with 69,500 tons, a small decrease contributed to by the delays caused by the Australian transport workers strike. Imports of sawn wood and pit props fell only a little way short of a million loads, but were 170,000 loads down on the year. Petroleum at 106½ million gallons was 6½ million gallons less than in 1927, but still the second highest total recorded in the history of the port.

Imports of fruit and vegetables for which Hull is the most important centre in the North of England were about average, but slightly below the 1927 level.

The exports of general merchandise, textiles, machinery and steel products drawn from a wide area, including Yorkshire and the Northern Midlands were about the same volume as in the previous year. The quantity of coal exported from Hull, however, showed some expansion, the total shipped abroad being 1,260,957 tons and London and coastwise 196,053 tons as against 957,017 tons and 184,554 tons respectively. The total for all the Humber ports, however, exceeds 3,838,000 tons as against 2,363,350 tons in 1927, and (omitting the strike year) 3,708,872 tons in 1925. It is only owing to the operation of the Yorkshire and Midland Counties coal marketing scheme that

some of the lost ground in the export trade has been recovered. The Humber total in 1928 represents only 7.3 per cent. of the United Kingdom export as against 12.7 per cent. in 1913; so that there is still room for improvement which it is confidently hoped will be witnessed in the coming months to the advantage of the coal industry, the port and the railway alike.

The past year in the Humber district was noteworthy for the largely increased number of steam fishing trawlers launched. The Hull, Beverley and Selby shipyards have a world-wide reputation for this class of vessel. The total put into the water was no fewer than 46 as against only 21 in the preceding twelve months.

The proposal of the Hull Corporation with regard to a new landing stage for the accommodation of the steam ferry traffic across the Humber between Hull and the North Lincolnshire bank of the river has received a check. At the Town's Meeting called to give approval to the promotion of the Corporation's Omnibus Bill in the present session of Parliament, the clauses referring to the new pier, etc., were rejected. The River Hull and river craft interests were almost unanimously against it, believing that the extension of the existing Corporation Pier to the verge of the navigable channel would hamper the freedom of movement of lighters, etc., and in other ways act prejudicially to the navigation of the River Hull upon the banks by which the principal flour and oil seed mills are situate. At this stage the technical report of the Humber Conservancy engineers had not been made known. Another section opposed the project on the ground of economy, the argument being that the time is inopportune to expend £100,000 or £120,000 upon it. It is possible, of course, for the promoters of the Bill to demand a poll of the ratepayers, but at the time of writing no decision on this point had been come to.

The directors of the London and North-Eastern Railway Company have reviewed the question of the proposed abolition of the level crossings at Hull and have intimated to the Hull Corporation their willingness to adhere to a contribution of £100,000 towards the cost, the "extreme limit of their total payment to a comprehensive scheme," and have added that they feel that the proposal requires further consideration from several points of view if it is to be carried through on the most satisfactory lines. Points of detail are to be discussed by representatives of the company and the Corporation having regard to these it is considered impracticable to promote a late bill in this session of Parliament. The total cost of the scheme is estimated at a million-and-a-quarter, to which the Government offers to contribute half-a-million from the Unemployed Grants Fund.

In the report of the Hull Shipping Committee comment is made that notwithstanding the fact that concessions have been made at some of the non-railway-owned ports, port charges in the United Kingdom as a whole are still about 60 per cent. higher than pre-war. As coal, in normal times, provides about 80 per cent. of the volume and, therefore, of the ship's filling capacity of British exports, shipowners generally would have welcomed some reduction in the charges on shipment coal for export at Hull and the other Humber ports. With regard to the application of the Humber pilots for the abolition of the 50 per cent. rebate on vessels in ballast, it is stated that this is being strenuously opposed. It is maintained on behalf of shipowners that the principle that the cost of pilotage should bear some relation to the vessels capacity to pay is a sound one. Prior to 1923 the Humber pilotage rates were based on draft and the ballast vessel naturally benefited by her reduced draft. The new schedule confirmed in 1923 replaced draft by tonnage. It is pointed out that but for the fact that pilotage is compulsory no pilot would be required for Hull or Immingham on the vessels of the light collier type which generally arrive in ballast and that these vessels are quite as free from accident when navigated by their own masters as by a compulsory pilot. It is contended that vessels in the coasting and home trades should be free of compulsory pilotage basis on the same basis as in the Thames. The report also records that the Humber Conservancy shipping dues now stand at 30 per cent. below statutory maxima and are 5 points below pre-war rates.

The Port of New Orleans.

WEIGHING CHARGES ON GRAIN ELIMINATED AT PUBLIC GRAIN ELEVATOR.

Effective January 1st, 1929, all weighing of grain passing through New Orleans Public Grain Elevator, heretofore performed by employees of the Board of Trade Grain Department, will be performed directly by the operating force of the elevator, and charges heretofore assessed for those services will be eliminated according to announcement of the Board of Commissioners of the Port of New Orleans. This change is expected to attract a considerable additional movement of the grain to the port, as the charges to be eliminated amount to from \$1.10 to \$1.50 a car. The action is similar to that taken by the Board earlier in the year at the Public Cotton Warehouse where tariff reductions were made by assuming the performance of services which had been performed by the New Orleans Cotton

Exchange. The following statement, under date of December 28th, was issued by Col. Marcel Garsaud, general manager of the dock board:—

"In the early part of the present year, the Board of Commissioners of the Port of New Orleans took up for consideration the question of reduction of charges both at the cotton warehouse and at the Public Grain Elevators.

"On September 1st, the Board was enabled to effect a reduction of approximately 20 cents. a bale at the cotton warehouse, largely due to the taking over from the Cotton Exchange of the weighing of cotton, and of performing the weighing by its own forces.

"Consistent with this policy, the Board now finds that it can likewise reduce the port charges on grain by elimination of the charges now being made for the weighing of grain, provided it takes over from the Board of Trade, and performs with its own forces, all the weighing of grain at the public elevators.

"As the present arrangement expires on December 31st, it has been decided by the Board that, beginning January 1st, 1929, the weighing of grain at the public elevators will be performed by its own forces, and the weighing charges specified in the tariff will be eliminated.

"It is believed that this will attract through this port a large volume of grain that is now diverted through other gulf ports."

DECEMBER SHIPPING AT NEW ORLEANS.

Traffic at the Port of New Orleans for the month of December, 1928, show notable increases in ocean trade, river trade, and transits in the inner harbour navigation canal. There arrived in the port 257 deep-sea vessels of 1,042,300 gross tons according to the dock boards records for that month—an average of more than eight vessels a day, an increase of 25 vessels and of 95,483 gross tons over the arrivals for the same month of the preceding year. There departed 246 vessels in deep-sea trades, or increased departures of 39 as compared with December, 1927.

Goods handled over the public wharves amounted to 356,987 tons, an increase of 9,103 over December, 1927, not including 29,111 tons of aluminium ore and coal handled at the public bulk commodity plant, and approximately 90,000 tons of grain shipped from the public grain elevator. The grain movement for the month was 3,266,098 bushels of corn, wheat, barley and oats, of which 2,629,890 were of corn. The board's conveyors discharged 1,686,705 bunches of bananas. An increase of 92,136 stems over December, 1927.

Deep-sea arrivals for December, 1928, were as follows:—

| Flag. | No. of Vessels. | Gross Tonnage. |
|------------|-----------------|----------------|
| American | 139 | 606,916 |
| British | 26 | 135,787 |
| Brazilian | 2 | 10,540 |
| Dutch | 2 | 12,577 |
| Danish | 5 | 14,424 |
| French | 8 | 51,313 |
| German | 3 | 12,493 |
| Greek | 1 | 4,152 |
| Honduran | 27 | 71,283 |
| Italian | 4 | 26,555 |
| Japanese | 1 | 9,482 |
| Mexican | 1 | 255 |
| Nicaraguan | 5 | 7,853 |
| Norwegian | 28 | 68,035 |
| Panamanian | 2 | 1,336 |
| Swedish | 3 | 9,299 |
| | 257 | 1,042,300 |

Inland watercraft over 25 tons arriving by the Mississippi River in December, 1928, amounted to 289 vessels of 109,781 tons, which is an increase of 51 vessels and of 13,590 tons as compared with the preceding December. In the total were included 110 Mississippi-Warrior barges of 59,158 tons, an increase of 29 barges and of 6,075 tons.

In the inner harbour navigation canal connecting Lake Pontchartrain with the Mississippi River there was a movement of 745 vessels of all classes, of 352,376 tons, an increase over the previous December of 45,322 tons. North-bound there were 47 Mississippi-Warrior vessels of 24,083 tons, 24 steamships of 106,474 tons, and 301 other vessels of 46,383 tons. South-bound were 45 Mississippi-Warrior vessels of 22,008 tons, 24 steamships of 108,580 tons, and 304 other vessels of 44,848 tons.

CALIFORNIA REDWOOD FOR LOUISIANA MILLS.

A regular movement of California Redwood through New Orleans to the mills of the Great Southern Lumber Company at Bogalusa is serving to supplement the yellow pine operations of that company. On January 5th the ss. "Abron" discharged 1,493,266 board feet of California logs at the Stuyvesant Docks for shipment to the Bogalusa plant, in addition to timbers and general merchandise for other consignees. This is the third large shipment of redwood recently arriving by the Redwood Line for Bogalusa.

BARGE-LINE TRAFFIC ON THE MISSISSIPPI.

It is estimated on the basis of preliminary figures for December that in 1928 the lower river division of the Mississippi-Warrior barge line handled 1,440,000 tons of merchandise north and south-bound, an apparent increase of nearly 200,000 tons over the quantity handled in 1927. Heavy movements of grain and cotton on the river are making an auspicious beginning for 1929.

JAVA COFFEE AT NEW ORLEANS.

In addition to the large receipts of Brazilian coffee at the Port of New Orleans, coffees produced in various other countries assist materially to swell the annual total, including small shipments regularly received from Java, particularly by the Isthmian Line. On January 4th, the ss. "Chattanooga City" discharged 1,500 bags of coffee from Java.

BRISBANE ADVOCATES RATE EQUALITY FOR NEW ORLEANS.

The strength of the position of the Board of Commissioners of the Port of New Orleans in opposing the recently-announced differential in favour of New York on jute imports, and a strong evidence of the sentiment of the country as a whole on the question of preferences accorded the northern harbour, are indicated tersely in a recent editorial by Arthur Brisbane, the foremost and most widely-read journalist of America. Says Mr. Brisbane:—

"Shipping Board handicaps New Orleans by a differential of 60 cents. per ton on importation of burlap from India. New York harbour gets the benefit of the differential.

"Uncle Sam should treat all his children alike. Why handicap Louisiana because the great harbour of New Orleans happens to be some miles west of New York?

"Has the Supreme Court of the United States had a chance to pass on that question?"

HIGH PRAISE FOR NEW ORLEANS WHARVES.

Mr. William Newsome, of Boston, Senior Vice-President of the United Fruit Company, was quoted as follows by newspapers on the occasion of a recent visit to New Orleans with Mr. I. K. Ward, President of the Fruit Dispatch Company:

"We are particularly impressed with the growth and progress of New Orleans dock facilities since our last visit here. Our own facilities are splendid and the Dock Board is most progressive and well equipped to take care of everybody."

RETIREMENT OF M. J. SANDERS.

After more than 50 years with the companies which formed the International Mercantile Marine, M. J. Sanders, manager of the Leyland Line at New Orleans, has retired and has been succeeded by E. J. McGuirk, who has been with the same company for the past ten years. Mr. Sanders is one of the most widely-known shipping men of the Gulf, and will remain President of Mobile Liners Inc. and a member of the advisory board of the Inland Waterways Corporation. Beginning his shipping career in Liverpool in 1878, he has been in New Orleans for 44 years, having opened the office here of the Western Pacific Steamship Co., in 1885. That company was absorbed by the Leyland Line in 1902. The Leyland Line, under the management of Mr. Sanders, was the first steamship company to advance funds to the Board of Commissioners of the Port of New Orleans for the construction of public wharves, a practice which has been of inestimable advantage in creating the modern wharf system as it now exists.

WATERFRONT QUARTERS FOR MERCHANT MARINE LIBRARY.

The Board of Commissioners of the Port of New Orleans have assigned to the American Merchant Marine Library Association, without charge, a room in their old Poydras Street tool house for the purpose of storing and assembling books for the use of merchant seamen. The room is directly in rear of the Poydras Street green coffee terminal, centrally located and convenient to shipping. It will greatly reduce the amount of time and labour required in placing libraries on board vessels.

In presenting the matter for consideration of the Board, the general manager said:

"The work done by this Association, and particularly by the local chapter, of which Mrs. Ernest Lee Jahneke is chairman, has been of great service and is a valuable adjunct to the facilities furnished by the port."

PORT OF NANTES.

The Department of Overseas Trade has received a report from the Acting British Consul at Nantes (Mr. F. Percy Bush) upon the Port of Nantes and the principal smaller ports depending on Nantes.

The report, which gives particulars of port accommodation and charges, such as harbour dues, quay dues, pilotage, ship-brokers' fees, etc., may be consulted by firms of British origin, capital and control upon application to the City Office of the Department of Overseas Trade (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

St. Thomas, Virgin Islands.

Annual Report of the Harbour Department for 1928.

The past year was a very successful year for the Harbour Department. With the one exception of 1920, it has been one of the best years, probably, in the history of this Department, and that year (1920) was during the inflation period just after the World War, and can hardly be considered in comparison with normal conditions.

The arrivals of ships of over 100 gross register tons, according to nationality, number and tonnage, were as follows:

Government Ships.

| Nationality | No. | Gross Tonnage |
|-------------|-----|---------------|
| American | 12 | 75,751 |
| Foreign | 8 | 32,174 |
| Total | 20 | 107,925 |

Merchant Ships.

| Nationality | No. | Gross Tonnage |
|-------------|-----|---------------|
| American | 154 | 384,949 |
| British | 208 | 870,297 |
| Danish | 30 | 148,716 |
| Dominions | 6 | 2,263 |
| Dutch | 28 | 142,989 |
| German | 73 | 470,982 |
| Greek | 6 | 25,756 |
| Italian | 21 | 120,984 |
| Jugoslavian | 31 | 156,620 |
| Portuguese | 1 | 4,765 |
| Norwegian | 19 | 52,076 |
| Spanish | 3 | 14,410 |
| Swedish | 6 | 34,088 |
| Total | 581 | 2,428,804 |
| Grand Total | 601 | 2,536,729 |

For comparison purposes, the figures for three previous years are given:—

| Fiscal Year | No. | Gross Tonnage |
|-------------|-----|---------------|
| 1925 | 428 | 1,472,242 |
| 1926 | 432 | 1,657,213 |
| 1927 | 429 | 1,711,163 |
| 1928 | 601 | 2,536,729 |

The collections for ships' dues, pilotage and quarantine fees far exceed the estimates at the beginning of the year. And although extra service naturally devolved on the equipment of the Department, the expenditures were kept well within the estimate.

The number of ships that paid pilotage and amount collected were as follows:—

Number of ships 479 Frcs. 78,437.50

Comparison with the three previous years shows the following:—

| Fiscal Year | No. | Francs |
|-------------|-----|-----------|
| 1925 | 297 | 48,198.75 |
| 1926 | 299 | 50,040.00 |
| 1927 | 300 | 48,515.00 |
| 1928 | 479 | 78,437.50 |

During the year the construction of a sea wall was started around "Long Bay," which is now nearing completion. This will greatly improve the water front, give a better approach to town from the West Indian Co.'s pier where tourist ships dock, and can be used as a recreation pier. In this the Harbour Department helped to a great extent, financially.

The construction of a dredge to deepen the "Haul Over" and other parts of the harbour is well under way and will soon be in operation.

Colonel Lindberg visited St. Thomas during the year, which is considered to be a great advertisement for the Islands. In preparing the landing field and his entertainment, the Harbour Board assisted financially to a great extent. The small craft traffic with the neighbouring Islands of vessels of less than 100 tons continued as usual. The tourist season was fairly good, and several warships visited the port during the winter months. The old dry dock is still lying in the bottom occupying valuable space in the deepest part of the harbour. It was recommended that this be removed as soon as possible. Everything worked smoothly in the Department during the year, and no untoward incident of any kind was reported.

North-East Coast Notes.

The year commenced on the North-East Coast with distinctly brighter trade prospects, due to a variety of circumstances. During the last weeks of 1928 an exceptional number of orders for shipping were placed on the Tyne, Wear and at Blyth, and the outlook in the local shipbuilding industry was completely changed and, while it is proverbially dangerous to prophesy there are not wanting those who promise better times in the shipbuilding, coal, and iron industries. The coal trade, especially for best steam and gas fuel is better, and not only are prices firmer, but the orders booked are on a larger scale than last year. The figures from most of the local shipping ports were satisfactory and for the eleven months ended with November the Tyne Improvement Commission reported an increase of 282,411 tons on the previous year, the total being 14,696,245 tons; the Wear Commission reported for the same period 4,549,111 tons, an increase of 45,340 tons, while Blyth reported shipments of 4,615,841 tons for the twelve months, a figure which although 351,995 tons below that of 1927, is only 116,087 tons below the 1913 figure. At the December meeting of the Tyne Improvement Commission it was reported that the shipments in the week ended December 12th, totalled 391,784 tons of coal and coke, the highest weekly output since June, 1924.

BENEFIT OF LONGER WORKING HOURS.

Mr. H. P. Everett, the chairman at that meeting, expressed the hope that the volume of trade would be better in 1929 than in the year then ending. They would have the benefit of longer loading hours each week-end, he said, and those longer trimming hours were, in his opinion, the most important local trade event of the year. The negotiations had extended over a period of nearly eighteen months, and the result could be acclaimed as satisfactory. He thought they could congratulate the employers and the men and their union on reaching a harmonious settlement. The new arrangement only came into operation on Saturday, December 15th, and in the Tyne alone no less than 15 ships benefited by working after 12 noon on Saturday. Some of the vessels sailed in the early hours of the evening, whilst on others working was necessary right up to 10 p.m. He felt sure that the future would show the advantage of the arrangements, both in the coal trade and in all the other trades which were dependent on shipping.

It may here be noted that it is not only at the Commissioners' staiths that vessels are benefiting by the later hours for at the London and North-Eastern Railway Co.'s Tyne Dock on the first day that the new rule came into operation no fewer than eight vessels were able to complete their loading of cargo and bunkers and sail the same night, and this applies also to other staiths. It is believed that the innovation will tend to a very material increase of the bunkering trade. It may be mentioned that the details of the extra working time have been incorporated in an agreement which has been signed by the Port Authorities of the Tyne, Wear, Blyth, Amble and Seaham, the London and North-Eastern Railway Company, shipowners, public and private staith owners, the Transport and General Workers' Union and the National Union of Railwaymen.

PRIVATE STAITHS RECORD.

During the week ended December 22nd the Pelaw Main Collieries at their two staiths on the Tyne made a record by their shipment of 26,000 tons of coal. The company recognise the need of more up-to-date loading facilities—the staiths were erected 80 years ago—and are erecting an entirely new one, the work on which is being pushed forward rapidly.

The return of the general trade at the Tyne Improvement Commission's docks and shipping places showed a decrease of 26.07 per cent. for the eleven months of this year. The total imports and exports were 119,581 tons compared with 161,743 tons in 1927, a decrease of 42,162 tons.

Mr. Frank Priestman in proposing the adoption of the report of the Finance Committee at a meeting of the Tyne Commission in December, said the rate of interest offered by the Commission for new money in the past three months was $4\frac{3}{4}$ per cent. as against the earlier rate of 5 per cent. The response to the lower offer had exceeded their expectations, and the rate of $4\frac{3}{4}$ per cent. would be continued through January and February. It was hoped to continue that figure throughout the coming year.

The statistical position of the Cleveland iron trade is steadily improving, as is shown by the reports of the Tees Conservancy. During December the imports of iron and steel from the Continent as well as from the coast ports totalled 18,625 tons compared with 20,024 tons in the December of 1927, and 7,059 tons in the same month of 1913. When referring to the Tees-side, it may be of interest to note that there is talk of a new industry coming to that area, and it is reported that negotiations are proceeding between the firm concerned and the Commissioners respecting some of the land reclaimed by the Commissioners on the North bank of the river.

There is also a prospect of an important development on Tyneside for the directors of Continuous Coal Carbonisation, Ltd., have made the following statement:—An agreement has

been come to between the Company and one of an important group of collieries for the provision of a suitable site in the district of the Tyne (Newcastle-on-Tyne) with the view to the erection thereon of a plant to carbonise 5,000 tons of coal per day. The colliery undertake to supply coal to such plant on an agreed cost plus profit basis. The necessary organising and financial arrangements for the erection of the plant and the marketing of the product are to be provided for by the formation of a new company in which Continuous Coal Carbonisation, Ltd., will have a substantial interest.

PERSONAL.

Sir John Priestman, head of the well-known Wear firm of shipbuilders, has been co-opted a member of the River Wear Commission, to fill the vacancy caused by the death of the Earl of Durham.

An interesting presentation was made to Mr. Benjamin Talbot, managing director of the Cargo Fleet Iron Co., Ltd., of his portrait in oils, the gift of directors and officials of the Company and of the South Durham Steel and Iron Co., Ltd. The gift was made to commemorate Mr. Talbot's joint presidency of the Iron and Steel Institute and the National Federation of Iron and Steel Manufacturers. Mr. Talbot has gained wide fame as the inventor of the continuous process of steel manufacture known as the Talbot process.

Mr. Herbert Shaw, secretary of Newcastle-on-Tyne Chamber of Commerce, has been honoured with the decoration of Knight of the Order of Christ by the Government of Portugal.

A well-known figure in the coal trade was removed by the death in December of M. August Marot, a director in Newcastle, of the firm of Messrs. D. M. Stevenson and Co., Ltd. of Glasgow.

The Marine Board of Hobart, Tasmania.

Annual Report for Year ending 30th June, 1928.

SEVENTIETH ANNIVERSARY OF THE CONSTITUTION OF THE BOARD.

On 8th January, 1858, His Excellency the Governor (Sir Henry E. Fox Young, Knt.) issued a Proclamation establishing the Marine Board of Hobart, so that on the 8th January, 1928, the Board completed 70 years of service in the interests of the port. On the 18th January, 1858, the first meeting of the Board was held, and there were present:—Mr. H. Darch, Collector of Customs; Mr. H. B. Tonkin, Mr. C. M. Maxwell and Mr. Wm. Crosby, appointed by the Governor-in-Council on the nomination of the Chamber of Commerce; O. H. Gilles, Mayor of Hobart.

At a meeting held on the 15th January, 1858, it was resolved: "That the salary of the Master Warden be £200 p.a., and that each Warden receive £54 12s. p.a.—the salaries provided by the Act, Clause 27."

It is interesting to note that to-day, 70 years later, the Master Warden still receives £200 p.a., while Wardens give their services without recompense of any kind.

On the 9th January, 1928 (the 8th falling on a Sunday), a gathering of Wardens and representatives of the commercial and shipping interests of the city, at which His Excellency the Governor (Sir James O'Grady, K.C.M.G.) was present, took place in the Boardroom in commemoration of the occasion.

ELECTION.

Wardens C. Davis, Sir John Evans, and J. G. Turner retired by effluxion of time in December of last year, and were duly nominated and elected for another three years. There were four contestants for the three vacancies.

IMPROVEMENTS.

The reclamation to the north of Ocean Pier continues in a satisfactory manner, and another half an acre is almost ready to hand over to the lessees. The Board has decided that a roadway be formed between the Railway Department's property and the Shell Co.'s lease of reclaimed land contiguous to the Railway Department's boundary, and extending to Macquarie Point. The street has been named Murdoch Street.

Other improvements considered have been:—The widening and lengthening of Argyle Street Pier; new pier to north of Ocean Pier; extension of Prince's Wharf; extension of Argyle Street, King's, Queen's and Ocean piers into the Constitution and Victoria Docks; but nothing definite has been decided until a full report is received from the engineer on the present state of existing wharves and their likely period of usefulness. This report is being delayed through the prevalent high tides which prevent the thorough inspection of the piles.

HOBART RIVULET DIVERSION.

A full and corrected statement of accounts to date was submitted by the City Council in February last, which showed that £64 9s. 8d. was due to the Council, instead of £1,378 15s. 3d., as previously claimed. The amended account was carefully checked by the Engineer and Secretary, certified correct, and paid.

WHARVES.

No work of magnitude with regard to repairs or construction has been carried out, the Foreman of Works reporting that all the structures are in fair order, with the exception of Argyle Street Pier, and timber and piles are now on hand or being delivered for repairing the inner portion of this pier.

ROADS.

Roads, drains, and footpaths within the Board's boundaries have received the usual attention, and are in good order. The City Council during the year effected a marked improvement to Morrison Street by laying down a concrete road. Portion of the road is within the Board's jurisdiction, and the Council agreed with the Board to concrete it for the sum of £224 17s. 3d.

DENISON CANAL.

Taking advantage of the Strahan Marine Board's dredge "Macquarie" being at Hobart, the Government arranged for the approaches to be cleaned out. No complaints have been received since the work was completed.

Traffic through the canal continues on the upgrade, with a corresponding increase in the fees received. Figures for the last three years are:—

| | 1925-26 | | | 1926-27 | | | 1927-28 | | |
|-----------------|---------|----|----|---------|----|----|---------|----|----|
| | £ | s. | d. | £ | s. | d. | £ | s. | d. |
| Receipts ... | 448 | 3 | 4 | 483 | 1 | 6 | 590 | 6 | 2 |
| Expenditure ... | 300 | 8 | 6 | 289 | 15 | 3 | 311 | 19 | 10 |

RALPH'S BAY NECK CANAL.

No change has taken place in the position, the canal still remaining in an incomplete state.

The first of forty annual contributions of £150 under "The Ralph's Bay Neck Canal Act, 1913," was paid in January, 1927, but no demand was received from the Government for the second contribution due in January of this year.

DOMAIN SLIPYARD.

Improvements in the nature of a retaining wall along the foreshore and the strengthening of the foundations of the upper portion of the large slip, so that a vessel may be "blocked up" and the cradle withdrawn to take up another vessel, have been effected. The slip during the last four months of the financial year has been almost continuously occupied by the whalers in preparation for another trip to the Antarctic.

FINANCIAL STATEMENT.

1st August, 1914 to 30th June, 1928:

| | | | | |
|--|-----|-----|---------|---------|
| Capital Expenditure ... | ... | ... | ... | £13,625 |
| Revenue ... | ... | ... | £8,804 | |
| Ordinary expenditure, including interest on capital outlay ... | ... | ... | £8,745 | |
| | | | Balance | £59 |

NOTE.—Nothing charged for depreciation or office management.

FRUIT SHIPMENTS.

Following the poor season, this year has yielded a prolific crop of fruit (apples and pears), no less a quantity than 2,441,620 bushels having been shipped overseas.

Shipments of fresh fruit to all parts totalled 3,504,476 bushels.

DIRECT SHIPMENTS FROM HUON PORTS.

From the Huon direct to Inter-State ports 734,558 cases were shipped, which number is included in the total number of bushels shipped to all ports.

TONNAGE.

For the first time the net tonnage figures for the year 1914 have been exceeded, and constitute a record for the port. This is largely accounted for by the number of overseas vessels calling to lift the record apple crop. The factory ship "N. T. Nielsen-Alonso" and whalers made their usual call and stay to and from the Antarctic.

| | No. of Arrivals. | Net Tonnage. | Gross Tonnage. |
|-------------|------------------|--------------|----------------|
| 1926-27 ... | 591 | 809,572 | 1,373,645 |
| 1927-28 ... | 596 | 885,640 | 1,514,895 |

FINANCIAL.

Ordinary receipts were satisfactory, and totalled more than for any previous year, amounting to £38,283. A comparison of the principal sources of revenue with the preceding year is as under:—

| | 1926-27 | 1927-28 |
|-------------------|---------|---------|
| Wharfage ... | 23,404 | 24,088 |
| Tonnage Rates ... | 4,495 | 5,191 |
| Pilotage ... | 1,998 | 2,333 |

During the year 25 debentures of £1,000 each were redeemed (18 from Sinking Fund Account and seven from revenue).

The Board's total liability on the 30th June, 1926, 1927 and 1928 is shown below:—

| | 1926 | 1927 | 1928 |
|---|--------|--------|--------|
| A.M.P. Society 4 per cent., due 1st Sept., 1927 | 45,000 | 45,000 | Nil |
| Hobart Savings Bank 6½ per cent., due 1st June, 1927 | 16,000 | Nil | Nil |
| Hobart Savings Bank 5½ per cent., due 1st Sept., 1927 | Nil | 5,000 | Nil |
| Ditto 5½ per cent. 20 years' Redemption Loan | 17,526 | 16,819 | 16,073 |
| Ditto 5½ per cent. Loan for 10 years | Nil | Nil | 25,000 |
| | 78,526 | 66,819 | 41,073 |
| Sinking Fund | 15,322 | 17,276 | 1,160 |

WHARFAGE RATES.

| | 1925-26 | 1926-27 | 1927-28 |
|--|---------|---------|---------|
| | s. d. | s. d. | s. d. |
| Average rate of wharfage on imports, per ton | 1 5.4 | 1 5.65 | 1 5.60 |
| Average rate of wharfage on total trade per ton (there is no wharfage rate on exports) | 0 8.09 | 0 8.14 | 0 8.15 |

INSURANCE FUND.

Claims under the Workers' Compensation Act, amounting to £17 11s. 6d., were paid during the year. After transferring £850 to the Superannuation Fund and paying £10 to the Fire Brigade Board, there remains to the credit of the Fund £10,161.

RESERVE FUND FOR SUPERANNUATION, ETC.

Transfers from the Insurance Fund amounted to £850, which, with interest earned (£98 0s. 2d.), increased the Fund by £948 0s. 2d., making it now £2,310 6s. 6d.

RESERVE FUND FOR PURPOSES OF SUB-SECTION III. OF SECTION 75 OF "THE MARINE ACT, 1921."

This Fund was increased by £323 2s. 3d. (second contribution from revenue £300 and interest £23 2s. 3d.), making it on the 30th June, 1928, £633 8s. 11d.

OUTPORTS.

Huon River.—Dredging alongside the Port Huon (Hospital Bay) Jetty was carried out by the dredge "Macquarie," the Board paying one-third of the cost, the balance being defrayed by the Government and Esperance Municipal Council.

Southport.—An attempt was made to utilise the same dredge at Southport, but it was found that the water was too shallow for it to carry out the work economically. Negotiations are still proceeding with the Government for the dredging to be done by means of the Board's Priestman grab dredge.

George's Bay.—The Government, having proclaimed new boundaries of the wharf at St. Helens so as to include the sheds adjacent thereto, a satisfactory arrangement has been made by the Board with the Shipping Companies using the port as to the occupation of the sheds.

LEADING LIGHTS.

The lights under the control of the Board have received the usual attention, and all of them are in fair order.

INTER-STATE CONFERENCES.

Warden L. F. Piesse represented the Board at a meeting of the Pilotage Committee, held at Melbourne in September, 1927. A very strong case was prepared and approved for presentation to the Commonwealth Government protesting against the bringing into force of the Pilotage clauses of the Commonwealth Navigation Act and suggesting that the present Statute be amended in such a way as to permit of the introduction of a system similar to that provided in the "English Pilotage Act, 1913," under which a supreme authority delegates to Local Authorities the actual control and management of pilotage within their respective districts. The Commonwealth Government has taken no steps up to the present to proclaim the pilotage clauses of the Navigation Act.

Warden the Hon. T. Murdoch, M.L.C., represented Tasmania at two meetings of the Permanent Committee of the Australian Harbour Authorities held at Melbourne—one in September, 1927, and the other in May, 1928. Many important matters were dealt with at these meetings, and arrangements made for the holding of the Sixth Conference of Harbour Authorities at Perth in October, 1928.

SHIPPING COMMUNICATIONS AND REPEAL OF THE COASTAL CLAUSES OF THE NAVIGATION ACT.

The majority report of the Federal Joint Committee of Public Accounts, before which the Board in conjunction with other bodies interested, placed in a concise manner the many disabilities which Tasmania labours under in its transport services with the mainland, included the following recommendations:—

1. Repeal of the Coastal Clauses of the Navigation Act.
 2. Amendment of the mail contract with the Orient S.N. Co. to provide for an additional call at Hobart during the peak of the tourist season when Inter-State passengers should be carried.
 3. A subsidy during the months of December, January and February for an improved passenger steamship service between Hobart and Sydney.
- It has yet to be learned what steps the Commonwealth Government intends taking on the recommendations quoted above.

(Since the close of the financial year the Prime Minister has stated his intention of repealing the Coastal Clauses of the Navigation Act under the conditions.)

HOBART AS A BASE FOR ANTARCTIC WHALING.

The "N.T. Nielsen-Alonso" continues to use Hobart as a base for Antarctic whaling. The factory ship with five whalers left Hobart on the 11th November, 1927, and returned on 21st February, 1928, after a successful cruise. The leaders of the venture, with the Consul for Norway, were entertained in the board room, when some interesting details of the cruise were related.

MISCELLANEOUS.

Lighting Wharves.—A new contract has been entered into with the Hydro-Electric Department for lighting the wharves for seven years from 1st October, 1927. The contract price is £809, as against £732 under the old agreement, but the new one provides for an increase of 12,612 c.p. on the present street lighting and about 2,000 c.p. on wharf lighting. The approaches to the wharves are now brilliantly illuminated, and it is thought the new contract will prove a very satisfactory one.

Wages Board.—A new determination of the City Council's and Marine Board's Wages Board came into force on the 26th April, 1928. The only alteration of any importance was the lowering of the rate of pay of labourers from 14s. 3d. to 13s. 9d. per day.

Handling of Vessels' Mooring Lines.—In January last the Board decided to undertake the engaging of men to handle mooring lines when requested to do so by the agents of vessels. The system has worked smoothly and at a cost considerably lower than prevailed formerly.

Removal of Wrecks.—The remains of the wrecks of the vessels "Derwent Hunter" and "Waterwitch," which had been lying off the Domain Shipyard for many years, have been removed.

Development of Colombo Harbour.

The drawing up of a scheme to provide for the gradual expansion of the Colombo Harbour had been engaging the attention of the authorities for some time past. In July, 1927, the Port Commission appointed a strong committee "to consider the future programme of development of the Port of Colombo." The committee held a number of meetings and the preliminary work of collecting all available information concerning the various schemes of harbour development which have been put forward from time to time was embarked upon.

It is now ascertained that this portion of the work has now been completed and the information collected has been embodied in a comprehensive report drawn up by the Harbour Engineer. This report is now being circulated amongst the members of the committee who will later discuss the various suggestions embodied therein and frame a policy for the development of the port. The report embodies every possible scheme for the development of the Colombo Harbour during the next 20 years.

The most important of the needs of the port is that of mitigating congestion ashore. A good deal of this has been relieved by the opening of open-air landing places for heavy goods. But this relief is inadequate for present needs. In the near future when the new Customs premises have been opened out the warehouse now used as baggage and examination room will again become available for import or export cargo. But these measures will not solve the problem of shore congestion particularly as the idea at present is to provide for the expansion of trade for a number of years to come. The problem, therefore, now before the Committee is that of re-modelling and re-constructing practically all the old buildings within the harbour area without interfering with the trade of the port. It is likely that all the old buildings at the South-West Breakwater will be demolished by stages and modern two-storied structures put up instead.

HARBOUR DREDGING.

One of the biggest items of expenditure in the Colombo Harbour is dredging. In the last budget nearly two lakhs of rupees have been provided under this head. A similar sum was provided the previous year. As the years go by this item is likely to grow increasingly expensive in view of the growing importance of Colombo as a Port of Call and the steady demand for deeper and deeper berths for large liners that call at this port. The new Customs House, which will be opened formally within about three months time, is a symbol of the port's enhanced importance, and it is likely that before long many improvements will be rendered necessary in the harbour itself. In this connection it will interest readers to know that already berths 33 N.E., 2 N.E. and 7 N.E. have been dredged and a total quantity of 40,800 cubic yards of material was removed and deposited at sea. This will, no doubt, enable larger and heavier vessels to anchor safely in the harbour.

PORT RULES.

As a result of a number of letters received from shipping agents, it has been decided at a recent meeting of the Colombo Port Commission (a) that the attention of all shipping agents

should be invited to the following Port Rule:—"Every vessel conveying passengers from a foreign port arriving in the harbour of Colombo shall, as soon as possible after she is moored, unless she be placed in quarantine, put down at least two accommodation ladders. If the ladders be on each side of the ship, the starboard ladder shall be reserved for persons leaving the ship, and the port ladder for persons coming on board. If the ladders be on the same side of the ship, the after ladder shall be reserved for persons leaving the ship and the forward ladder for persons coming on board. If the vessel be placed in quarantine the ladders shall be put down as soon as she is released from quarantine." (b) "That the master attendant be requested to re-draft the rule, in order to bring it up-to-date, and to make it suited to present requirements."

With regard to the landing of passengers from ships which do not enter the harbour, the following arrangements and fees have been agreed upon: (1) No landing from vessels outside the harbour will be allowed, unless the vessel is free from infectious disease. (2) The maximum fee payable to the Port Surgeon for visiting a ship outside the harbour will be Rs.75. (3) All persons to embark in special cases will be examined by the Port Surgeon before embarkation, and will not be allowed to embark unless the Port Surgeon certifies that they are free from infectious disease. (4) The fee to be charged for such examination and issue of the necessary certificate will be Rs.5 per head for each person up to 10, and Rs. 2.50 for each person beyond that number. The fee to include any necessary vaccination.

A New Appointment.

Mr. H. Warren Lee, O.B.E., has been appointed a Special Director at the Elswick Works of Messrs Vickers-Armstrongs, Ltd.

Mr. Warren Lee joined the technical staff of Messrs. Sir W. G. Armstrong, Whitworth & Co., Ltd., in 1902, and in 1917 took over the control of the Gun Mounting Drawing Offices, Elswick Works, on the retirement of Mr. C. H. Murray.

After the termination of the War, when it was necessary, due to the lack of armament orders, to increase the range of manufacturers at Elswick Works by the introduction of commercial products, the Technical Staff was extended, under his direction, to cope with the manufacture of locomotives, marine propelling installations and dock and harbour machinery.



Mr. H. WARREN LEE, O.B.E.

In 1926 Messrs. Sir W. G. Armstrong, Whitworth & Co., Ltd., reorganised their Elswick and Scotswood Works, and Mr. Warren Lee was appointed manager of the Gun Mounting Department, and was responsible for the design and manufacture of all gun mountings at Elswick Works.

During the period from the termination of the War up to 1928, when Messrs. Vickers, Ltd. and Sir W. G. Armstrong, Whitworth & Co., Ltd., merged to form Messrs. Vickers-Armstrongs, Ltd., there were designed, manufactured and installed the 16-in. triple turrets of H.M. ships "Nelson" and "Rodney," and the 8-in. twin mountings for four "County" Class cruisers.

Mr. Warren Lee was awarded the O.B.E. for his work in connection with gun mountings during the War.